

3272

1983
Mercury
Task Force

Mercury Files

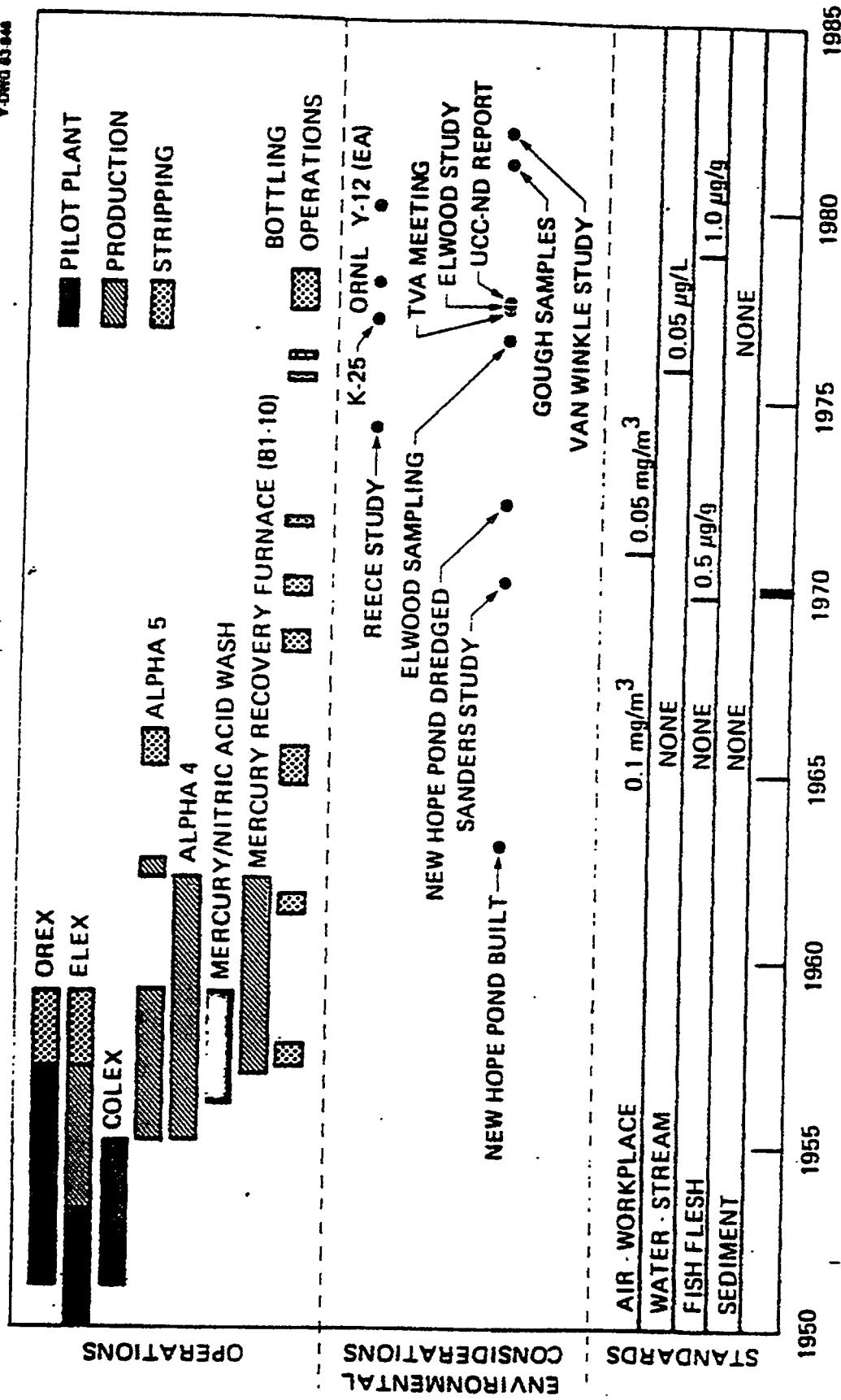


Fig. 1.11. Chronology of lithium isotope separation operations at the Y-12 Plant and related information.

① ② a) Chronology of APP Development Program (5 pages)

8-31-50 to 2-26-54

NO IDENTIFYING NO'S - Confidential

<u>of</u>	<u>scale</u>	<u>date began ops</u>	<u>cost</u>
Elex	laboratory	8-31-50	
Elex	pilot	9-51	\$ 69K
Elex	production		\$ 5M, 14M , 35M, 44M
Orex ^{DT}	laboratory	9-24-51	
Orex ^{DT}	pilot - small	12-31-51	
Li ⁶ deadline = Fall 1953			
Orex _A - dual temperature process			
numerous problems to solve			
Elex - multi-stage process			
Orex DT - dropped			
Orex _A - chem. reflux - pilot			
4-28-53 to 3-8-54			
Orex CR - couldn't achieve max. enhancement of material			

2nd APP authorized for \$ 145M FY 1954
 Test Facility 2"
 Collex 3"
 Elex 12"

b) Chronology of Alpha-5 Plant (9 pages, no. 10 thru 18)

11-2-53 to 2-26-54

Collex 20"

? Steam plant built at same time as A-5

Kinney = centrifuge pumps

Buffalo = solvent pumps

Robbins + Meyers solvent pumps

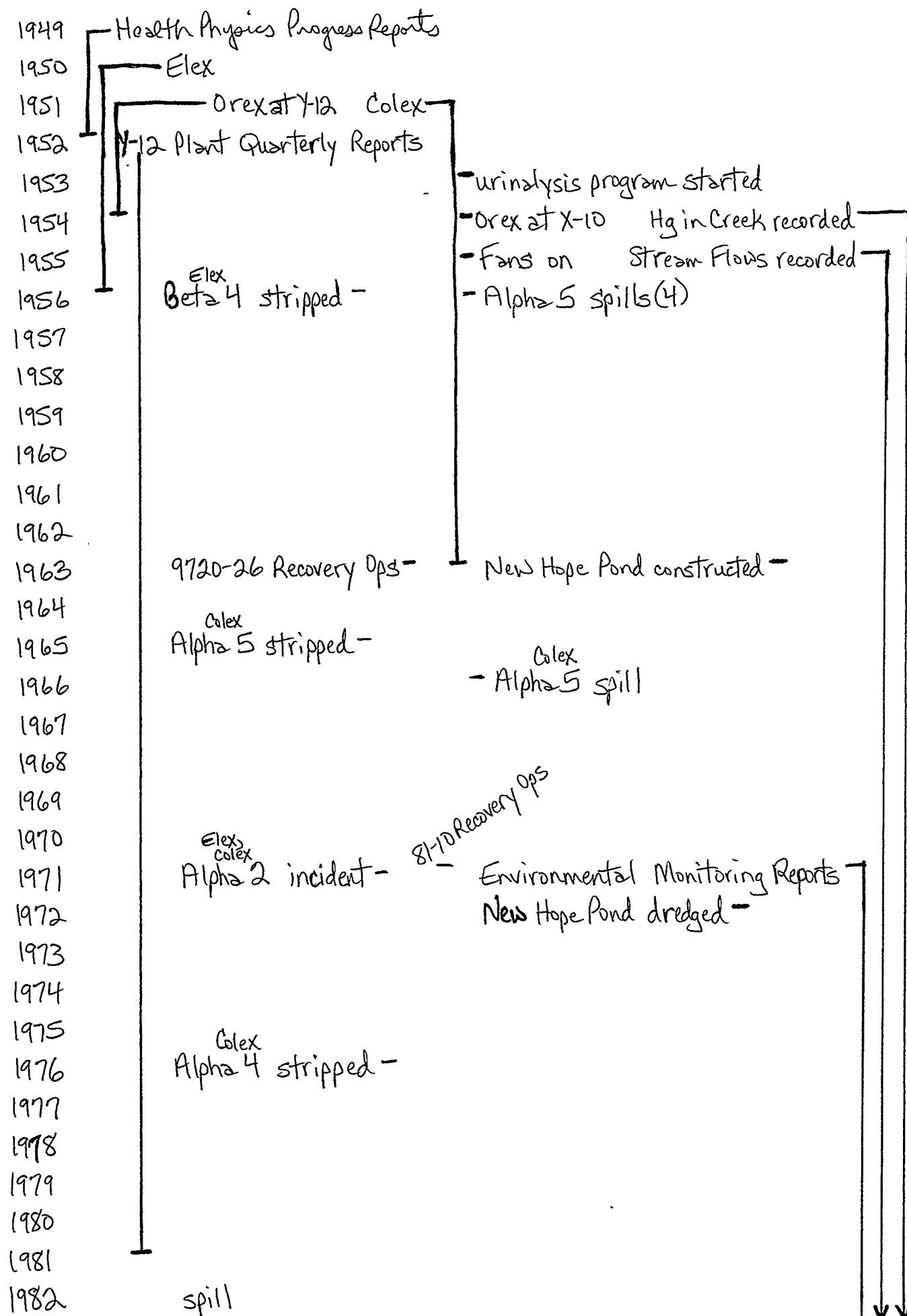
L-4

12-23-53

B-2 2nd 9212 expansion - concentrate and fabrication facilities
 = 9998

4 3 boilers

TIMELINE



ORR MERCURY BUILDINGS

X-10

<u>Building Number/Name</u>	<u>Operations</u>	<u>Time Period</u>	
✓ 3503	Orex Purex?	1956	?
✓ 3592	Orex/lithium research	50s and early 60s 1956	5,000 kg
✓ 4501	Orex	1954 (6 months)	23,000 kg
4508	? research	?	
✓ 4505	Metalex	1955	2,000 kg

"Hg concentrations above background":

- storm drain outfall soth of 4508
- outfall from 4500S spill
- monitoring stations
- outfall near 3036
- outfall from 3500 area spill
- 2525 spill

K-24

K-1024 } electronics shop ←
 K-1420 }
 K-1303 } Hg recovery facility in the

Y-12

9201-1		Hg containers	Y-12 Y-4145 air dist
9201-2 ¹	ECP	Colex/Elex pilot plant	1950-51 1953, 1951-58
9201-3			
9201-4 ^{1,2}	alpha 4	Colex	1956-63
9201-5 ^{1,2}	alpha 5	Colex	1956-63
9204-1			
9204-2		lithium operations (Hunt 1993)	
9204-2E		lithium operations (Hunt 1993)	
9204-3			
9204-4 ^{1,2}	beta 4	Elex pilot plant-production scale	1953-56
81-10 ^{1,2}	R	Hg transfer and storage; roasting	1957-1962
9720-26	W	Hg storage	1965-
9929-3		flakes	
9733-1	Od	Orex development	1951-54
9733-2	EP	Elex pilot plant	1950-51
9202 ¹	Op	Orex-development pilot	1951-54
9805		lithium operations (Hunt 1993)	
9808 ¹		lithium operations? pump repair	
9404-9		rubber shop	
9723-18		changhouse	
9723-19		changhouse	
9728		laundry	

9727-3

hydrogen burner

9401-3

steam plant

- ¹ results of routine air sampling program at the Y-12 Records Center (p. IIA271)
² largest discharges from these buildings (p. IIA212)

MERCURY INFORMATION SOURCES

Interviews:

- J. Dykstra
- J. Goquin
- W. Hibbitts
- C. Keller
- G. Legay
- J. Napier
- C. West
- W. Wilcox

Y-12 Central Files

- active records
- voluntary submission
- indexed content

Y-12 Records Center

- inactive records
- older records
- non-indexed content need departmental listings

Classified Mercury Records

- 1983 Task Force Files

Shift Superintendent Logbooks

- since 1940s

Document Response Centers
• recent

Y-12 Technical Library
• LION > 1981
• stand catalog
• LION > 1981

Y-12 Engineering Library
• LION > 1981

DOE Information Resources Centers
• clean up documents

DSTI Research Library
• directed search
• directed search

MERCURY INFORMATION OVERVIEW

Sources: Interviews
Y-12 Mercury Files
Other Y-12 sources
Other ORR areas (X-10, K-25)
DOE and State sources

Results:

Mercury use and release-

Y-12
Other ORR areas (X-10, K-25)
Oak Ridge Community
Other nearby areas

Environmental data-

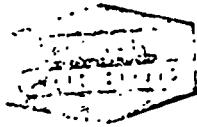
Air
Surface water
Ground water
Soil
Sediment

G. Bruce- location and time series with data sources referenced (need a good surface water system map that includes the surrounding areas)

D. diTomaso- table of input parameters for modeling

Hap West

Y/TS-1610



NUCLEAR DIVISION

July 20, 1983

Gordon G. Fee, 9704-2, MS-14, Y-12

Recommendations of Y-12 Mercury Task Force

You had asked that before the Y-12 Mercury Task Force disbanded we collect our thoughts concerning follow-up actions to our study. The following are the recommendations suggested by the Task Force:

- for review*
1. We recommend a strong, vocal, proactive Environmental Affairs Department. Two key personnel should be added to the department: someone with environmental, ecological, or water quality training and a person who can help with data analysis and presentations. We urge that the necessary training and tools be provided so we can make the most of opportunities to present Y-12's environmental affairs story as effectively as possible. We should seize and make opportunities to present our plans, visions, projects, recommendations, and positions on environmental affairs to DOE-ORO, to R. G. Romatowski at the Y-12 Program Review, in management council meetings, in the Y-12 Plant Quarterly Reports, and at other relevant opportunities.
 2. We recommend that the Environmental Affairs Department participate in the planning and execution of any continuing mercury recovery efforts at Y-12. We will give T. R. Butz and G. E. Kamp a file of selected mercury documents and key information. They should keep up to date the picture we have pulled together on accountability and environmental impacts. Environmental Affairs should serve Y-12 as the coordinating group for environmental projects and as a member of the team on other programs or projects that have significant environmental impact.
 3. We recommend that our mercury data base (19 file drawers that include over 1,300 items and 400 classified reports) be transferred intact to the Y-12 Plant Records Department. Files that we are obligated to return to the owners will be noted in the bibliographic data base with the name of the custodian; otherwise, the files should be kept intact for at least the next 12 months. Copies of the bibliographic data base (indexed by author, permuted subject, and dates) will be filed with the Environmental Affairs Department (T. R. Butz) and the Y-12 Plant Records Department (W. D. Minter).
- Y-12 Hand
11*

Gordon G. Fee
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July 20, 1983

*Engineering
Chairman
(Contact)*

4. We urge that Environmental Affairs sponsor and supervise an experimental program to pin down the exact source of the 1-2 oz per day of mercury going into East Fork Poplar Creek. The "active source" study of December 1982 was an excellent start toward this goal, but we need to find out where the mercury is which is creating this leakage (building location, sump or drain line origin, origin in wet weather springs leaking into sumps, etc.). We need to pin down the source precisely so that we can intelligently plan a fix. If it turns out that lines are a major source, our group is opposed to strong flushing or any other action that may further weaken the already deteriorated lines. We favor lining as a solution if we cannot reroute the lines for economic reasons. But we urge that a high priority be given first to obtaining the facts (this summer) concerning where the 146 g per day of New Hope Pond effluent is originating.

*C. W. Weber
Chairman
File
TDR
Underwood*

5. We recommend that Y-12 change its mercury sampling methods for East Fork Poplar Creek. The grab sample approach is superior to the composite sampling because we can acidify and preserve grab samples. (We cannot treat the composite sample in this way because it is used for many other analyses in addition to mercury and acid additions would interfere with these.) Comparison of grab versus composite samples for mercury over the last few years shows significant differences and suggests that composites are biased low when compared to the grab sample results. Still, the flow data for grab samples is not as good as that for composites because of its being a reading on Monday mornings when the grab samples are taken.

PMH MHR

Because we need good mercury effluent data, we recommend that Environmental Affairs sponsor and implement the use of a new rig to take a flow-proportional sample only for mercury in a properly conditioned, preserved sample container. The samples should be taken weekly, not monthly, at least for the next year. We request that the Plant Laboratory give a 0.05 ppb quality analysis on these samples. We recommend that G. E. Kamp (chairman), R. R. Turner, R. J. McElhaney, H. H. Abbe, and J. N. Underwood design and implement the new approach as soon as it is feasible. We recommend an overlap of methods for three months in Y-UB with the subsequent replacement of the old composite method with the new approach.

*cycle
year
plan*

6. The Environmental Affairs Department should take the lead in reviewing with the Environmental Sampling and Plant Laboratory personnel all the sampling and analysis methods used to ensure that the methods are responsive to the needs of the 1980s for environmental management. A task force should be set up to accomplish this goal methodically over a period of time; it should not be a crash, one-time effort. C. W. Weber and others should be involved, but the effort needs to be a three-focus study: analysis, sampling, and Y-12 regulation requirements.

Gordon G. Fee
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- Get it*
- Aug 24*
- CX*
already has just a program
- Conf'd*
Scraped
3/100,000
7. We recommend that Environmental Affairs work with the Quality Division and the Plant Laboratory to provide Y-12 with a controls program which will give confidence to plant management that we turn out unbiased, contamination-free mercury analyses in all media (fish, water, mud, soil, etc.).
 8. We recommend that the Plant Laboratory (R. J. McElhaney), working with R. G. Jordan's office, design and implement a program to provide standards for soils and sediments. Realizing that the only NBS-certified standard available is 1.1 ppM, we recommend the preparation of three Oak Ridge secondary standards (about 100, 500, 1000 ppM). These could be synthetic, spiked, or actual sediments, but they should be certified by means of a well-designed (statistically and analytically) round-robin program of qualified Oak Ridge area laboratories. Outside laboratories (Tennessee Valley Authority and U.S. Geological Survey) should be invited to participate if the preparation of the extra quantities required does not appear too costly.
 9. We recommend that Environmental Affairs sponsor a sediment criterion development program, with the work to be done by the Environmental Sciences Division at Oak Ridge National Laboratory (ORNL). The program should be designed jointly between the Environmental Affairs Department at Y-12 and the Environmental Sciences Division at ORNL with the objective of establishing a reasonable basis for action respecting contaminated soils or "dry" sediment (i.e., soils not in contact with stream water and fish). The program should be concerned with East Fork Poplar Creek floodplain sediments and Y-12 soils contaminated with mercury and should address air contamination due to vaporization in our Oak Ridge climate or due to suspension and inhalation if that is a more serious risk.
 10. We recommend that Health, Safety, and Environmental Affairs (M. L. Jones) organize a program to follow up on mercury workers to examine whether there is any evidence of mercurialism 20 years after the Alloy Development Program (ADP). (The last comprehensive study was done in 1974.) We urge the use of an independent medical group, not Union Carbide or Oak Ridge Associated Universities (ORAU), and a protocol furnished by the National Institute of Occupational Safety and Health (NIOSH) similar to that used in the 1974 study. We would not restrict the study to ADP mercury workers; instead, we would assign the following priorities:

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a. Employees in the Y-12 mercury urinalysis program from 1950 to 1966

- (1) Employees still on the Y-12 payroll
- (2) Employees now located at ORNL, the Oak Ridge Gaseous Diffusion Plant, or Paducah Gaseous Diffusion Plant
- (3) Retired employees

b. Those other employees on the Y-12 payroll who wish to be checked.

C. M. West is familiar with the files on record (including approximately 27,000 urinalysis results as well as the names and social security numbers of the participating employees).

11. We recommend that Y-12 go on record as endorsing the declassification of the total quantities of mercury used in the lithium programs and the total quantities pumped so that a more open discussion of the accountability problem may be allowed. (A letter to this effect should be sent to DOE-ORO).
12. We recommend that a presentation (about a half hour in length) be made available to Y-12 division managers concerning the Y-12 mercury story and that this presentation include a question-and-answer session.
13. We recommend that Environmental Affairs conduct a mercury sampling program (or incorporate it into their drilling program) at the recently discovered site of the Rust Dumping Shed and the storage yard west of Beta-4 (Building 9204-4). Both areas have been alleged to be sources of undocumented spillage.
14. We would like to express to you the lack of consensus on the subject of the stripping of Alpha-4 (Building 9201-4). We all wish it had been done long ago, but we are divided on the wisdom of beginning it now. It can be done without any health risks, but it can probably be accomplished without serious environmental impacts only at a very high cost. Some of the group feel that we would be better off building new space and isolating this area. (Providing space in the old K-25 cascade building has never been attractive when the realistic costs of stripping have been considered.) We suggest that a careful study of Alpha-4 stripping be undertaken and that this study involve people who know both the classification and environmental aspects of stripping and disposal. Our Task Force's estimate of the amount of mercury sold as Alpha-5 (Building 9201-5) scrap was 14,000 lb. Dupont Smith, a scrap

*understand
but don't
agree -*

not false

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dealer, told us that he obtained 20,000 lb of mercury from his purchase of scrap and that Pitts, a scrap dealer from Crossville, recovered 34,000 lb of mercury from his scrap purchase. Our estimates of the mercury content in Alpha-4 are also conservative. The scrap today may be considered an RCRA waste! This time, disposal (as opposed to stripping) is going to be costly. As a further point, we urge that no action be taken without having a method for cleaning up the contaminated water generated in the stripping.

15. We recommend that present efforts on Building 9201-4 be expanded to isolate (both ventilation-wise and traffic-wise) the Alpha-4 office and other utilized space from the former mercury-use areas. The same kinds of cleanup techniques and approaches used successfully in 1956 to reduce the mercury-in-air concentrations in Alpha-4 should be considered for use today (cleanup, painting, ventilation, etc.).
16. We recommend that ORAU be warned that its data tape containing a 10 percent sample of the Y-12 mercury-in-air concentrations may be flawed (it was given to them years ago). We have tried to check their 10 percent sample against our quarterly reports, etc., and it looks strange. We need to ensure that they do not give the data out or use it themselves until we confirm or fix it. C. M. West should be asked to handle this assignment.
Agree
ORAU will verify
17. We believe that the Environmental Affairs Department should reevaluate the situation in the basement of Alpha-2 (Building 9201-2) and consider the desirability of adding more sulfur in some form to the soil there to reduce the vapor pressure.
WJW
18. We recommend issuance of the definitive report prepared by the Task Force at such time that the core sampling of Watts Bar and Chickamauga Lakes is completed; this should confirm, as best we can today, the picture of losses to the environment. We hope that this will be completed by the end of July.

Wm. J. Wilcox Jr.

Wm. J. Wilcox, Jr., K-1001, MS-132, ORGDP (6-0435)

WJW:11b

Gordon G. Fee
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July 20, 1983

Distribution:

J. W. Arendt, K-1225, MS-253, ORGDP
T. R. Butz, 9106, MS-5, Y-12
C. D. Doty, K-1580, MS-595, ORGDP
M. L. Jones, 9106, MS-5, Y-12
V. W. Lowe, 9723-11A, MS-1, Y-12
L. L. McCauley, K-1580, MS-567, ORGDP
J. C. White, 9704-2, MS-6, Y-12
Wm. J. Wilcox, Jr., K-1001, MS-132, ORGDP - RC

2-21-96
SMFlack

- Y/TS- 1631 Hg in Fish 12/96 by L.L. McCauley
1632 Fleaking & Shipments
1634 Environmental Sampling
1633 Worker Health
1629 General Subjects
1630 Significant Documents

1629: ✓ 1966 96,600 lbs Nickel from A-5 scrap
from M-220 1973 ✓ class'd Hg-contam'd solid waste / from material burial

- 1630: ✓ 1965 from ~~theft~~ ^{related} doc. (physical control over Hg audit)
M-223 25 flakes (1 pellet) shortage
✓ 1981 Goffs data " flukes being serially numbered "at the request of the FBI"
✓ 1984 Reduction of Hg in Plant Effluents

✓ copy 7 pgs of the Hg File Database 2/28/90

Internal Correspondence

LOCKHEED MARTIN ENERGY SYSTEMS, INC

Date: January 6, 1997
To: R. T. Ford, J. E. Powell
c: R. M. Keyser
From: L. L. McCauley, 9115, MS-8219, 4-7593 (NoRC) 
Subject: Correspondence Pertaining to Mercury Usage

While preparing for my departure of January 31, 1997, I came upon a number of letters, memos, worksheets, and tabulations that pertain to the use of Mercury at Y-12 over the past 40 years.

To ensure that these documents are not inadvertently discarded and destroyed, I sorted through them, compiled them by several general areas of interest, and issued them as Y/TS documents as follows:

- Y/TS-1629 Compilations of Correspondence Pertaining to Use of Mercury at Y-12: General Subjects
- Y/TS-1630 Compilations of Correspondence Pertaining to Use of Mercury at Y-12: Significant Documents
- Y/TS-1631 Compilations of Correspondence Pertaining to Use of Mercury at Y-12: Mercury in Fish
- Y/TS-1632 Compilations of Correspondence Pertaining to Use of Mercury at Y-12: Flasking and Shipments
- Y/TS-1633 Compilations of Correspondence Pertaining to Use of Mercury at Y-12: Worker Health
- Y/TS-1634 Compilations of Correspondence Pertaining to Use of Mercury at Y-12: Environmental Sampling

Copies of these documents have been forwarded to the HSEA Document Center, Y-12 Central Files, and the Mercury Task Force Files.

LLM:sjs

OAK RIDGE Y-12 PLANT INFORMATION CONTROL FORM

DOCUMENT DESCRIPTION (Completed by Requesting Division)

Document No. <u>TS-1284/36</u>	Date of Request <u>2/25/97</u>	Requested Date of Release (Allow 5 to 10 Days)	Page Count <u>1</u>
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Unclassified Title: LANDWRITTEN NOTES TAKEN BY S. FLACK ON
FEBRUARY 21, 1997

Author's/Requestor's Name <u>S. W. Wiley</u>	Telephone No., Pager No. and Plant Address <u>6-0263, 417-5417, 9106, MS-8023</u>	Account Number <u>2366-0002</u>
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INTENDED AUDIENCE: Public Environmental Regulators NWC DOE Contractors Other _____

TYPE: Abstract Brochure Co-op Report Formal Report Informal Report
 Invention Disclosure Journal Article News Release Photograph/Visuals Technical Progress Report
 Thesis/Term Paper Videotape Other _____
 Oral Presentation (identify meeting, sponsor, location, date): _____

PATENT OR INVENTION SIGNIFICANCE Yes No (Identify) _____ Document will be published in proceedings Yes No
 Document has been previously released Yes No (Reference) _____ Document will be distributed at meeting Yes No

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CLASSIFICATION OFFICE. Title: <u>U</u> Abstract: <u>NA</u> DOCUMENT: Level <u>U</u> Category <u>-</u> Weapons Data <u>-</u> Sigma <u>-</u> <u>M. O. Franks</u> <u>2-28-97</u> Y-12 Classification Office Date	<input type="checkbox"/> <u>Wanda P. M. M. 3 Mar 97</u> Patent Office Date <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
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Document No. <u>V/EXT-00166</u>	Date of Request <u>2/25/97</u>	Requested Date of Release (Allow 5 to 10 Days)	Page Count <u>2</u>
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Unclassified Title: Extracted pages from: Y/TS-1629. Compilations of Correspondence pertaining to Use of Mercury at Y-12: General Subjects. 12/26 L.L. McCauley

Author's / Requestor's Name <u>S. W. Wiley</u>	Telephone No., Pager No. and Plant Address <u>6-0263, 417-5417, 9106, MS-8023</u>	Account Number <u>2366-0002</u>
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INTENDED AUDIENCE: Public Environmental Regulators NWC DOE Contractors Other ChemRisk

TYPE: Abstract Brochure Co-op Report Formal Report Informal Report
 Invention Disclosure Journal Article News Release Photography/Visuals Technical Progress Report
 Thesis/Term Paper Videotape Other _____
 Oral Presentation (Identify meeting, sponsor, location, date). _____

PATENT OR INVENTION SIGNIFICANCE Yes No (Identify) _____ Document will be published in proceedings Yes No
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DIVISION REVIEW AND APPROVAL (Completed by Requesting Division)

CLASSIFICATION REVIEW (Authorized Derivative Classifier (ADC)) Classification of: Title: <u>U</u> Abstract: <u>NA</u> DOCUMENT: Level <u>U</u> Category <u>-</u> <u>A.J. FRASER</u> <u>RJFraser</u> <u>2-26-97</u> Print Name Signature Date	DOCUMENT REQUEST APPROVED (Division/Department Mgr.) <u>S. W. Wiley</u> <u>TOA/HS Coordinator</u> Please Print Name and Title <u>JD Giley</u> <u>2/25/97</u> Signature Date
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CLASSIFICATION OFFICE: Title: <u>U</u> Abstract: <u>-</u> DOCUMENT: Level <u>U</u> Category <u>-</u> Weapons Data <u>-</u> Sigma <u>-</u> <u>R.Bailey</u> <u>2/27/97</u> Y-12 Classification Office Date	<input type="checkbox"/> <u>Waived / P. McKeeney</u> <u>2/28/97</u> Patent Office Date <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
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Compilations of Correspondence
Pertaining to Use of Mercury at Y-12:
General Subjects
(Y/TS-1629)

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R.H.Grazer 2-26-97
Authorized Signature Date

Authorized Derivative Declassifier

R.Bailey SV 2/27/97
Authorized Signature Date

This material has been reviewed by the Y-12
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P.L. O'Kesney 2/28/97
Technical Information Office Date

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Unclassified Title: Extracted pages from: YTS-1630. "Compilations of Correspondence Pertaining to Use of Mercury at Y-12: Significant Documents 12/96 L.L. McCauld"
 Author's / Requestor's Name S. W. Wiley Telephone No., Pager No and Plant Address 6-0263, 417-5417, 9106, MS-8023 Account Number 2366-0002

INTENDED AUDIENCE: Public Environmental Regulators NWC DOE Contractors Other ChemRisk

TYPE: Abstract Brochure Co-op Report Formal Report Informal Report
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 Oral Presentation (identify meeting, sponsor, location, date): _____

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DIVISION REVIEW AND APPROVAL (Completed by Requesting Division)

CLASSIFICATION REVIEW [Authorized Divisional Classifier (ADC)] Classification of: Title: <u>UNC</u> Abstract: <u>NA</u> DOCUMENT: Level <u>U</u> Category <u>NA</u> S. W. Wiley Print Name <u>SW Wiley</u> Signature <u>SW Wiley</u> Date <u>2/25/97</u> 	DOCUMENT REQUEST APPROVED (Division Department Mgr) S. W. Wiley <u>TOA/HS Coordinator</u> Please Print Name and Title Signature <u>SW Wiley</u> Date <u>2/25/97</u>
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APPROVAL AND RELEASE (Completed by the Classification/Technical Information Control Office)

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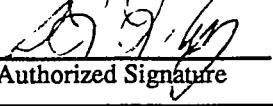
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DOCUMENT DESCRIPTION (Completed by Requesting Division)

Document No.	Date of Request	Requested Date of Release (Allow 5 to 10 Days)	Page Count
MS/CRPZ-0295	02/25/97		2

Unclassified Title: CUT-OFF DATE MERCURY TASK FORCE INDEX
(selected pages only) \$MF

Author's / Requestor's Name	Telephone No., Pager No. and Plant Address	Account Number
S. W. Wiley	6-0263, 417-5417, 9106, MS-8023	2366-0002

INTENDED AUDIENCE: Public Environmental Regulators NWC DOE Contractors Other ChemRisk

TYPE: Abstract Brochure Co-op Report Formal Report Informal Report
 Invention Disclosure Journal Article News Release Photograph/Visuals Technical Progress Report
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 Oral Presentation (identify meeting, sponsor, location, date): _____

PATENT OR INVENTION SIGNIFICANCE Yes No (Identify) _____ Document will be published in proceedings Yes No
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To: DONNA LAWSON
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From: L.L. McCANCEY

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Technical Information Office	Date

DATE: 2/28/1990

Y-12 MERCURY DATABASE

PAGE:

M-FILE-NO: 206

REPORT: Y/DK-249 AUTHOR: SMITHWICK, R. W.
DATE: 1980, MARCH DRAWER: 10 CLASS: C
TITLE: DETAILED PORE-VOLUME CALCULATIONS FOR MERCURY POROSIMETRY
SUBJECT: TECHNICAL MEMO

M-FILE-NO: 207

REPORT: LXXIV-5972 AUTHOR: BLUMKIN, S.
DATE: 1957, MAY DRAWER: 10 CLASS: S
TITLE: ADP PROGRAM AT Y-12, SURVEY AND LONG-RANGE PLANNING
SUBJECT: TECHNICAL MEMO

REPORT: LXXXIV-4996 AUTHOR: CENTER, C. E.
DATE: 1956, JANUARY DRAWER: 10 CLASS: S
TITLE: EVALUATION OF IMPROVEMENT PROGRAM FOR COLEX FACILITIES
SUBJECT: TECHNICAL MEMO

REPORT: LXXXIV-5279 AUTHOR: CENTER, C. E.
DATE: 1956, JUNE DRAWER: 10 CLASS: S
TITLE: LONG TERM ADP PLANNING LETTER FROM C. E. CENTER (UCC) TO S.
R. SAPIRIE (AEC)
SUBJECT: TECHNICAL MEMO

✓ REPORT: Y-1099 AUTHOR: MOORE, W. C.
DATE: 1955, SEPTEMBER DRAWER: 10 CLASS: S
TITLE: PRELIMINARY DESIGN AND COSTS FOR PROPOSED ALLOY PRODUCTION F
ACILITIES
SUBJECT: TECHNICAL REPORT

REPORT: Y-F42-120 AUTHOR: DOW, NEAL
DATE: 1961, FEBRUARY DRAWER: 10 CLASS: S
TITLE: MAXIMUM PRODUCTION CAPABILITY FOR FULL AND PARTIAL OPERATION
OF COLEX FACILITIES - CASE STUDIES
SUBJECT: TECHNICAL MEMO

REPORT: Y-F46-49 AUTHOR: HARPER, W. L.
DATE: 1955, JANUARY - 1957, OCTOBER DRAWER: 10 CLASS: S
TITLE: A SUMMARY HISTORY OF COLEX OPERATIONS IN ALPHA-5 JAN, 1955 -
OCT, 1957
SUBJECT: TECHNICAL MEMO

[REDACTED]

DATE: 2/28/1990

Y-12 MERCURY DATABASE

PAGE: 51

M-FILE-NO: 389

REPORT: AUTHOR: HICKMAN, H. D.
DATE: 1976, MARCH 18 DRAWER: 17 CLASS: U
TITLE: EXCESSING OF MERCURY FOR DISPOSAL BY GSA, LETTER FROM H. D.
HICKMAN (ERDA) TO J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
COMMENT: ERDA DECLARED 6,000 FLASKS OF MERCURY EXCESS. (ALSO M-389, -
393, -422)

M-FILE-NO: 390

REPORT: AUTHOR: EBERT, J. W.
DATE: 1971, FEBRUARY 11 DRAWER: 10 CLASS: X U
TITLE: MERCURY INCIDENT IN 9201-2, MERCURY CONTAMINATION STUDY
SUBJECT: TECHNICAL REPORTS/MEMOS

M-FILE-NO: 391

REPORT: AUTHOR: BAYS, M. C.
DATE: 1976, JUNE 5 DRAWER: 17 CLASS: U
TITLE: UCC & ORO MEETINGS ON REMOVAL OF MERCURY FROM ALPHA-4
SUBJECT: CORRESPONDENCE, INTERNAL
COMMENT: STORAGE OF GSA & ERDA OWNED MERCURY

UNCL FILE
LW

REPORT: AUTHOR: WING, J. F.
DATE: 1976, JULY 28 DRAWER: 17 CLASS: U
TITLE: FLASKING AND STORAGE PROCEDURES, LETTER FROM J.F. WING (ERDA
TO J.T. CONSIGLIO (GSA)
SUBJECT: CORRESPONDENCE, EXTERNAL
COMMENT: PROCEDURE FOR STORAGE & FLASKING OF GSA OWNED MERCURY AT UCC
(ALSO M-760, -783)

REPORT: AUTHOR: BAYS, M. C.
DATE: 1976, JUNE 15 DRAWER: 17 CLASS: U
TITLE: UCC/DOE MEETING ON REMOVAL OF MERCURY FROM ALPHA-4
SUBJECT: CORRESPONDENCE, INTERNAL

M-FILE-NO: 392

REPORT: AUTHOR: NOOK, J. C.
DATE: 1975, MAY 19 DRAWER: 17 CLASS: U
TITLE: MERCURY REMOVAL BUILDING 9201-4, LETTER TO D.W. SMITH FROM J
.C. NOOK
SUBJECT: CORRESPONDENCE, INTERNAL

[REDACTED]

DATE: 2/28/1990

Y-12 MERCURY DATABASE

PAGE: 125

M-FILE-NO: 480

REPORT: ORO-129341 AUTHOR: KELLER, C. A.
DATE: 1966, APRIL 11 DRAWER: 17 CLASS: S
TITLE: ALPHA-4 PLANT OPERATIONS, LETTER FROM C. A. KELLER (AEC) TO
R. F. HIBBS (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
COMMENT: PLANS FOR ALPHA-4 PLANT OPERATIONS AFFECT AEC'S DECISION TO
RELEASE FLASKS OF MERCURY TO GSA.

REPORT: Y-AA-391 AUTHOR: HIBBS, R. F.
DATE: 1965, JUNE 29 DRAWER: 17 CLASS: S
TITLE: ALPHA-4 OPERATION STUDY, LETTER FROM R. F. HIBBS (UCC) TO C.
A. KELLER (AEC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
COMMENT: OPERATIONAL DATA AT VARIOUS FRACTIONS OF CAPACITY WITH MERCURY
INVENTORY REQUIRED FOR EACH.

REPORT: Y-AA-426 AUTHOR: HIBBS, R. F.
DATE: 1966, APRIL 25 DRAWER: 17 CLASS: S
TITLE: ALPHA-4 PLANT OPERATIONS, LETTER FROM R. F. HIBBS (UCC) TO C.
A. KELLER (AEC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
COMMENT: EFFECT OF REQUIREMENTS ON LITHIUM PRODUCTION. INCLUDES MERCURY
REQUIREMENTS.

M-FILE-NO: 481

REPORT: AUTHOR: KELLER, C. A.
DATE: 1969, SEPTEMBER 30 DRAWER: 17 CLASS: U
TITLE: MERCURY TO BE TRANSFERRED TO GSA FOR DISPOSAL, LETTER FROM C.
A. KELLER (AEC) TO J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
COMMENT: 15,000 FLASKS OF MERCURY IN PROCESS SYSTEM TO BE TRANSFERRED
TO GSA. (ALSO M-384)

M-FILE-NO: 482

M-482
MTK
REVIS/CS
6/7/90

REPORT: AUTHOR: WEST, C. M.
DATE: 1958 - 1959 DRAWER: 13 CLASS: U
TITLE: SURFACE WATER SAMPLING 4-11-58 THRU 1-14-59
SUBJECT: HEALTH RECORDS [Jan - Dec 1958]

[REDACTED]

DATE: 2/28/1990

Y-12 MERCURY DATABASE

PAGE: 20

M-FILE-NO: 786

REPORT: AUTHOR: POLLEY, DANIEL B.
DATE: 1983, JUNE 3 DRAWER: 10 CLASS: U
TITLE: STATEMENT OF INTERVIEW WITH MR. DANIEL B. POLLEY CONCERNING
GSA MERCURY RECEIVED AT Y-12 PLANT
SUBJECT: TECHNICAL REPORTS/MEMOS

REPORT: AUTHOR: SANDERS, M.
DATE: 1983, JUNE DRAWER: 10 CLASS: U
TITLE: INTERVIEW WITH MERWYN SANDERS ON BETA-4 PROCESS
SUBJECT: TECHNICAL REPORTS/MEMOS

REPORT: AUTHOR:
DATE: 1950 -1954 DRAWER: 10 CLASS: C
TITLE: CHRONOLOGY OF ADP DEVELOPMENT PROGRAM
SUBJECT: TECHNICAL REPORTS/MEMOS
COMMENT: MAJOR EVENTS DURING 1950-54 ARE LISTED.

REPORT: AUTHOR: EVANS, GEORGE W.
DATE: 1983, JUNE 3 DRAWER: 10 CLASS: U
TITLE: INTERVIEW WITH GEORGE W. EVANS REGARDING SPILL ON DECEMBER 3
1, 1982
SUBJECT: TECHNICAL REPORTS/MEMOS

REPORT: AUTHOR: ZANOLLI, G. F.
DATE: 1979, JULY DRAWER: 10 CLASS: U
TITLE: TRANSCRIPT OF VIDEOTAPE: INTERVIEW WITH DR. MICHAEL D. UTIDI
JAN
SUBJECT: TECHNICAL MEMO
COMMENT: INTERVIEW WITH MAJOR AUTHOR OF MERCURY CRITERIA DOCUMENT FOR
NIOSH

REPORT: AUTHOR: LAFRANCE, LEO
DATE: 1983, MAY 31 DRAWER: 10 CLASS: U
TITLE: INTERVIEW WITH LEO LAFRANCE MAY 31, 1983
SUBJECT: TECHNICAL REPORTS/MEMOS

M-FILE-NO: 787

REPORT: AUTHOR: PERRY, J. E.
DATE: 1958, JULY 2 DRAWER: 17 CLASS: C
TITLE: MERCURY PURIFICATION, LETTER FROM J.E. PERRY TO J.S. REECE
SUBJECT: CORRESPONDENCE, INTERNAL
COMMENT: EFFECTS OF IMPURITIES IN THE COLEX PROCESS

[REDACTED]

DATE: 2/28/1990

Y-12 MERCURY DATABASE

PAGE: 204

M-FILE-NO: 796

REPORT: AUTHOR: HICKMAN, H. D.
DATE: 1977, JANUARY 7 DRAWER: 17 CLASS: U
TITLE: PREOPERATIONAL REVIEW - MERCURY FLASKING, LETTER FROM H. D.
HICKMAN (ERDA) TO J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
COMMENT: SAFETY PROVISIONS CONTAINED IN Y/MA-5556 ADEQUATE

✓ m-340 FILE FILED REPORT: AUTHOR: HICKMAN, H. D.
DATE: 1976, APRIL 8 DRAWER: 17 CLASS: U
TITLE: SAFETY ANALYSIS AND PREOPERATIONAL REVIEW OF ALPHA-4 MERCURY
FLASKING OPERATION, LETTER FROM H. D. H
SUBJECT: CORRESPONDENCE, EXTERNAL
COMMENT: Y-12 TO DOCUMENT SAFETY ANALYSIS OF MERCURY HANDLING OPERATI
ON. (ALSO M-391, -422)

m-796 ✓ 1/10/90 REQUEST FOR ✓ REPORT: AUTHOR: MURRAY, J. P.
RECORDED DATE: 1956, JANUARY 3 DRAWER: 17 CLASS: U
TITLE: REQUEST FOR Y-12 PERSONNEL TO VISIT OLIN MATHIESON, LETTER F
ROM J.P. MURRAY (UCC) TO W.C. GARDINER (✓
SUBJECT: CORRESPONDENCE, EXTERNAL
COMMENT: ASKS INFORMATION ON OLIN MATHIESON'S EXPERIENCE WITH MERCURY
CONTAMINATION

✓ REQUESTED ✓ 1/10/90 REPORT: AUTHOR: GOOGIN, J. M.
DATE: 1955, MAY 12 DRAWER: 17 CLASS: U
TITLE: REPORT OF THE COMMITTEE ON ALPHA-5 CONTAMINATION, LETTER FRO
M J.M. GOOGIN TO W.K. WHITSON, JR.
SUBJECT: CORRESPONDENCE, INTERNAL
COMMENT: SURVEY OF HEALTH-AFFECTING FACTORS IN ALPHA-5

✓ C.R.D. ✓ FILE ✓ M-796 REPORT: AUTHOR:
DATE: 1955, DECEMBER 9 DRAWER: 17 CLASS: U
TITLE: SOURCE SAMPLES FOR SOLVENT VAPOR, LETTER TO F. V. TILSON
SUBJECT: CORRESPONDENCE, INTERNAL
COMMENT: 9-PAGE LIST OF SAMPLES TAKEN IN 9201-4

✓ C.R.D. ✓ FILE ✓ M-796 & M-764 REPORT: AUTHOR: LAFRANCE, LEO J.
DATE: 1956, JANUARY 9 DRAWER: 17 CLASS: ✓ C.R.D.
TITLE: SHOWER STUDY, LTR FROM LEO J. LAFRANCE TO W.K. WHITSON, JR.
SUBJECT: CORRESPONDENCE, INTERNAL
COMMENT: SOLVENT VAPOR READINGS AT SKIN SURFACE

DATE: 2/28/1990

Y-12 MERCURY DATABASE

PAGE: 210

M-FILE-NO: 817

REPORT: AUTHOR: CHEMICAL RUBBER CO.
DATE: 1972 DRAWER: 19 CLASS: U
TITLE: MERCURY IN THE ENVIRONMENT - AN EPIDEMIOLOGICAL AND TOXICOLOGICAL APPRAISAL
SUBJECT: OPEN LITERATURE

REPORT: AUTHOR: FORSTNER & WITTMANN
DATE: 1979 DRAWER: 19 CLASS: U
TITLE: METAL POLLUTION IN THE AQUATIC ENVIRONMENT
SUBJECT: OPEN LITERATURE
COMMENT: BOOK PUBLISHED BY SPRINGER-VERLAG TELLS OF THE MINAMATA, JAPAN, TRAGIC MERCURY POISONING.

REPORT: AUTHOR: GARRETT, DAVID
DATE: 1975, OCTOBER DRAWER: 19 CLASS: U
TITLE: MATERIALS BALANCE AND TECHNOLOGY ASSESSMENT OF MERCURY AND ITS COMPOUNDS ON NATIONAL AND REGIONAL BASIS
SUBJECT: U
COMMENT: PREPARED FOR EPA OFFICE OF TOXIC SUBSTANCES

M-FILE-NO: 818

UP GRAD CO
TO C-RD
5/18/90

REPORT: AUTHOR: TYL, E.
DATE: 1976, SEPT. 30-1977, SEPT. 30 DRAWER: 7 CLASS: X C-RD
TITLE: STATUS OF MERCURY INVENTORY
SUBJECT: MERCURY SHIPMENT DATA
COMMENT: HANDWRITTEN SUMMARY VERIFIED BY TYL

M-FILE-NO: 819

RECORDED
2/10/90
SEE
M-744

REPORT: AUTHOR: GOUGH, LARRY
DATE: 1982, FEBRUARY 7 DRAWER: 17 CLASS: U
TITLE: DICTATED BY PHONE TO S. B. GOUGH (ORNL) FROM LARRY GOUGH (U. S. GEOLOGICAL SERVICE)
SUBJECT: CORRESPONDENCE, EXTERNAL
COMMENT: ANALYES OF AQUATIC BRYOPHYTES ALONG BEAR CREEK AND E. FORK P OPLAR CREEK DEC. 5, 1981

REPORT: AUTHOR: RICHARDS, E.
DATE: 1963, SEPTEMBER 26 DRAWER: 17 CLASS: U
TITLE: TRIP REPORT - SEPTEMBER 18-19, 1963, LETTER FROM E. RICHARDS (GSA) TO DIRECTOR, INSPECTION DIVISION
SUBJECT: CORRESPONDENCE, EXTERNAL
COMMENT: VISUAL INSPECTION SHOWED 25 PERCENT OF Y-12 FLASKS NEEDS TO BE REPLACED DUE TO LEAKAGE

DATE: 2/28/1990

Y-12 MERCURY DATABASE

PAGE: 21

M-FILE-NO: 843

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11/22/89

REPORT: AUTHOR: ELWOOD, J. W.
DATE: 1977, MARCH 22 DRAWER: 17 CLASS: U
TITLE: MERCURY CONTAMINATION IN POPLAR CREEK AND THE CLINCH RIVER,
LETTER FROM J. W. ELWOOD TO C. R. RICHMOND
SUBJECT: CORRESPONDENCE, INTERNAL
COMMENT: BUSINESS CONFIDENTIAL CORRESPONDENCE.

Released
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REPORT: AUTHOR: RICHMOND, C. R.
DATE: 1977, MARCH 22 DRAWER: 17 CLASS: U
TITLE: BUSINESS CONFIDENTIAL REPORT ON MERCURY CONTAMINATION IN POPLAR CREEK AND CLINCH RIVER, LETTER FROM
SUBJECT: CORRESPONDENCE, INTERNAL

Released
11/22/89

REPORT: AUTHOR: WHITE, J. C.
DATE: 1977, APRIL 4 DRAWER: 17 CLASS: U
TITLE: REPORT ON MERCURY CONTAMINATION IN POPLAR CREEK AND THE CLINCH RIVER, LETTER FROM J. C. WHITE TO R. G. JORDAN
SUBJECT: CORRESPONDENCE, INTERNAL

Released
11/22/89

REPORT: AUTHOR: JORDAN, R. G.
DATE: 1977, APRIL 13 DRAWER: 17 CLASS: U
TITLE: COMMENTS ON JERRY ELWOOD'S REPORT, LETTER FROM R. G. JORDAN
TO C. R. RICHMOND
SUBJECT: CORRESPONDENCE, INTERNAL

Released
11/22/89

REPORT: AUTHOR: RICHMOND, C.R.
DATE: 1977, JUNE 13 DRAWER: 17 CLASS: U
TITLE: MERCURY CONTAMINATION IN POPLAR CREEK AND CLINCH RIVER SEDIMENTS, LETTER FROM C.R. RICHMOND TO S.I. APPENDIX, ET AL
SUBJECT: CORRESPONDENCE, INTERNAL

Released
11/22/89

REPORT: AUTHOR: RICHMOND, C.R.
DATE: 1977, MARCH 22 DRAWER: 17 CLASS: U
TITLE: BUSINESS CONFIDENTIAL REPORT ON MERCURY CONTAMINATION IN POPLAR CREEK AND CLINCH RIVER, LETTER FROM
SUBJECT: CORRESPONDENCE, INTERNAL

M-FILE-NO: 844

Released
11/22/89
12/16/89

REPORT: AUTHOR: BLAYLOCK, B. G. ETAL
DATE: 1983 DRAWER: 10 CLASS: U
TITLE: PRELIM. REPORT OF CONCENTRATIONS OF MERCURY, PCB'S, AND URANIUM IN AQUATIC ORGANISMS
SUBJECT: TECHNICAL REPORTS/MEMOS
COMMENT: UNPUBLISHED REPORT OF STUDY OF UPPER EAST FORK POPLAR CREEK

MUB
5/5/95

AM 5/4/95

OAK RIDGE Y-12 PLANT INFORMATION CONTROL FORM

DOCUMENT DESCRIPTION (Completed By Requesting Division)

Document No. <u>-775/ChR2-0139/DEL REV</u>	Author's Telephone No. <u>6-0263</u>	Acct. No. <u>23660003</u>	Date of Request <u>5/4/95</u>
Unclassified Title: <u>Y-12 MERCURY DATABASE PRINTOUT</u>			

Author(s) Requestor: Steve Wiley

- TYPE: Formal Report Informal Report Progress/Status Report Co-Op Report Thesis/Term Paper
- Oral Presentation (Identify meeting, sponsor, location, date): _____
- Journal Article (Identify Journal): _____
- Other (Specify): To Be Released to ChemRisk, Phase II

Document will be published in proceedings No YesDocument will be distributed at meeting No YesDocument has patent or invention significance No Yes (Identify) _____Document has been previously released No Yes (Reference) _____

224 pp

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Title(s): U Abstract: NADOCUMENT: Level P-5 SRD Category NASignature J. Rowan Date 5-9-95RECEIVED FOR DEC/CLASS - DATE

DOCUMENT REQUEST APPROVED (Division or Department)

Signature

5/4/95 Date

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R.J. Fraser Date 5/9/95
Y-12 Classification Office

- Editor Date
- Waived /P. McKenney Date
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Technical Information Office	Date

MS/CHR2-0139/DEL REV

1-1 AUTHOR: DATE: 1955-01
TITLE: TECHNICAL DIVISION MONTHLY REPORT FOR JAN, 1955
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1101 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

1-2 AUTHOR: DATE: 1955-02
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR FEB., 1955
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1102 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

1-3 AUTHOR: DATE: 1955-03
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR MARCH, 1955
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1103 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

1-4 AUTHOR: DATE: 1955-04
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR APRIL, 1955
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1104 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

1-5 AUTHOR: DATE: 1955-05
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR MAY, 1955
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1105 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

1-6 AUTHOR: DATE: 1955-06
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR JUNE, 1955
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1106 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

1-7 AUTHOR: TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT DATE: 1955-07
SUBJECT: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR JULY, 1955
REPORT NUM: Y-1107 CLASS: S DRAWER: 3
CUSTODIAN: CF
COMMENT:

1-8 AUTHOR: TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT DATE: 1955-08
SUBJECT: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR AUG., 1955
REPORT NUM: Y-1108 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

1-9 AUTHOR: TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT DATE: 1955-09
SUBJECT: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR SEPT., 1955
REPORT NUM: Y-1109 CLASS: S DRAWER: 3
CUSTODIAN: CF
COMMENT:

1-10 AUTHOR: TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT DATE: 1955-10
SUBJECT: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR OCT., 1955
REPORT NUM: Y-1110 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

1-11 AUTHOR: TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT DATE: 1955-11
SUBJECT: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR NOV., 1955
REPORT NUM: Y-1111 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

1-12 AUTHOR: TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT DATE: 1955-12
SUBJECT: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR DEC., 1955
REPORT NUM: Y-1112 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

1-13 AUTHOR: DATE: 1956-01
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT, JANUARY 1956
SUBJECT: PROGRESS REPORTS
REPORT NUM: Y-1127 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

1-14 AUTHOR: DATE: 1959-09 1960-07
TITLE: Y-12 TECHNICAL PROGRESS REPORT - FIRST QUARTER, FY 1960 JULY - SEPT 1959
SUBJECT: QUARTERLY TECHNICAL PROGRESS REPORT, Y-12 PLANT
REPORT NUM: Y-1267 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-15 AUTHOR: DATE: 1963-05 1963-06
TITLE: Y-12 TECHNICAL PROGRESS REPORT PART D - LABORATORY MAY - JUNE 1963
SUBJECT: QUARTERLY TECHNICAL PROGRESS REPORT, Y-12 PLANT
REPORT NUM: Y-1431-D CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-16 AUTHOR: MCBRIDE, W. T. DATE: 1957-09
TITLE: A RAPID DETERMINATION OF MICR QUANTITIES OF MERCURY IN URINE AND WATER USING THE MERCUMOMETER
SUBJECT: TECHNICAL REPORT
REPORT NUM: Y-1178 CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-17 AUTHOR: McMURRAY, C. S. DATE: 1958-01
TITLE: PORTABLE MERCURY VAPOR DETECTOR
SUBJECT: TECHNICAL REPORT
REPORT NUM: Y-1188 CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-18 AUTHOR: KRIEG, A. DATE: 1956-05
TITLE: ROUTINE METHOD FOR DETERMINATION OF THE STABILITY OF LITHIUM AMALGAM IN CONTACT WITH AQUEOUS LITHIUM HYDROXIDE SOLUTIONS
SUBJECT: TECHNICAL REPORT
REPORT NUM: Y-1119 CLASS: C DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-19 AUTHOR: TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPI, 1956
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1015 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

1-23 AUTHOR: SACHS, V. DATE: 1956-07 1956-09
TITLE: SELECTED PHYSICAL PROPERTIES CP MERCURY IN THE TEMPERATURE RANGE 100 TO 1000C
SUBJECT: TECHNICAL REPORT
REPORT NUM: Y-889 CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-24 AUTHOR: DATE: 1952-07
TITLE: Y-12 PLANT QUARTERLY REPORT, CCT-DEC, 1952
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1000 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-25 AUTHOR: DATE: 1952-10 1952-12
TITLE: Y-12 PLANT QUARTERLY REPORT, JAN-MARCH, 1953
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1001 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

1-26 AUTHOR: DATE: 1953-01 1953-03
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1953
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1002 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

1-27 AUTHOR: DATE: 1953-07 1953-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPT, 1953
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1003 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

Y-12 MERCURY DATA BASE

PAGE : 5

1-28 AUTHOR: DATE: 1953-10 1953-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCT.-DEC., 1953
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1004 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

1-29 AUTHOR: DATE: 1954-01 1954-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JAN-MARCH, 1954
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1005 CLASS: S DRAWER: 1
CUSTODIAN: CF
COMMENT:

1-30 AUTHOR: DATE: 1954-04 1954-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1954
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1006 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

1-31 AUTHOR: DATE: 1954-07 1954-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPT., 1954
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1007 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

1-32 AUTHOR: DATE: 1954-10 1954-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCT-DEC., 1954
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1008 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

1-33 AUTHOR: DATE: 1955-01 1955-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JAN-MARCH, 1955
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1009 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

Y-34 AUTHOR: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1955 DATE: 1955-04 1955-06
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-101n CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

Y-35 AUTHOR: Y-12 PLANT QUARTERLY REPORT, JULY-SEPT., 1955 DATE: 1955-07 1955-09
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1011 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

Y-36 AUTHOR: Y-12 QUARTERLY REPORT, OCT-DEC., 1955 DATE: 1955-10 1955-12
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1012 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

Y-37 AUTHOR: Y-12 PLANT QUARTERLY REPORT, JAN-MARCH, 1956 DATE: 1956-01 1956-03
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1013 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

Y-38 AUTHOR: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE 1956 DATE: 1956-04 1956-06
SUBJECT: PROGRESS REPORTS
REPORT NUM: Y-1014 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

Y-39 AUTHOR: Y-12 PLANT QUARTERLY REPORT, CCR-DEC., 1956 DATE: 1956-10 1956-12
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1016 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

- 1-40 AUTHOR: DATE: 1960 - 1970
TITLE: COMPILATION FILE OF MERCURY-RELATED SUBJECTS AND CORRESPONDENCE
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: S DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: MERCURY LOSS, PROCEDURES, TRANSFER TO GSA, BOTTLING, INVENTORY, PACKAGING, EXCESS MERCURY DISPOSAL BY GSA.
- 1-41 AUTHOR: DATE:
TITLE: ACCOUNTABILITY OF EXCESS MERCURY ACCOUNTING MANUAL PROCEDURE DRAFT
SUBJECT: SPECIALIST'S FILE
REPORT NUM: CLASS: U DRAWER: 15 /
CUSTODIAN: SMITH, D. W.
COMMENT:
- 1-41 AUTHOR: DATE: 1963-0 3
TITLE: SOLVENT INVENTORY 9201-4 STORAGE 3-21-63
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT:
- 1-41 AUTHOR: DATE: 1963-0 3
TITLE: SOLVENT INVENTORY 9201-4 STORAGE 3-21-63
SUBJECT: SPECIALIST'S FILE
REPORT NUM: CLASS: U DRAWER: 15 /
CUSTODIAN: SMITH, D. W.
COMMENT:
- 1-41 AUTHOR: KELLER, C. A. DATE: 1963-0 3-29
TITLE: LETTER FROM C. A. KELLER (AEC) TO R. F. HIBBS (UCC) TRANSMITTING A COPY OF THE DEFENSE MATERIALS SYSTEM - GSA PROCEDURE PFI
INVENT TO THE STORAGE OF MOVEWAY /
SUBJECT: SPECIALIST'S FILE
REPORT NUM: CLASS: U DRAWER: 15 /
CUSTODIAN: SMITH, D. W.
COMMENT:
- 1-41 AUTHOR: SMITH, D. W. DATE: 1965-0 1-18
TITLE: MERCURY PACKAGING PROCEDURE, D. W. SMITH TO R. D. WILLIAM
SUBJECT: SPECIALIST'S FILE
REPORT NUM: CLASS: U DRAWER: 15 /
CUSTODIAN: SMITH, D. W.
COMMENT: BLDG. 9201-4 MERCURY AREA PATROL AND INSPECTION PROCEDURE

- N-41 AUTHOR: SMITH, D. W. DATE: 1965-04
TITLE: MERCURY BOTTLING AND ACCOUNTABILITY PROCEDURE ARC MELTING DEPARTMENT
SUBJECT: MERCURY FLASK DATA
REPORT NUM: CLASS: U DRAWER: 8
CUSTODIAN: SMITH, D. W.
COMMENT: SCALE CHECK, LEAKING FLASKS
- N-41 AUTHOR: SMITH, D. W. DATE: 1965-04
TITLE: MERCURY BOTTLING AND ACCOUNTABILITY PROCEDURE ARC MELTING DEPARTMENT
SUBJECT: SPECIALIST'S PILE
REPORT NUM: CLASS: U DRAWER: 15 /
CUSTODIAN: SMITH, D. W.
COMMENT: SCALE CHECK, LEAKING FLASKS
- N-41 AUTHOR: HIBBS, R. F. DATE: 1965-07-07
TITLE: MERCURY HANDLING AT THE Y-12 PLANT. LETTER FROM R. F. HIBBS (UCC) TO C. A. KELLER (AEC)
SUBJECT: SPECIALISTS FILE
REPORT NUM: CLASS: C DRAWER: 15 /
CUSTODIAN: SMITH, D. W.
COMMENT: /
- N-41 AUTHOR: HIBBS, R. F. DATE: 1965-07-07
TITLE: MERCURY HANDLING AT THE Y-12 PLANT. LETTER FROM R. F. HIBBS (UCC) TO C. A. KELLER (USAEC)
SUBJECT: SPECIALIST'S FILE
REPORT NUM: CLASS: C DRAWER: 15) /
CUSTODIAN: SMITH, D. W.
COMMENT: /
- N-41 AUTHOR:
TITLE: COST OF BOTTLING MERCURY DATE: 1969-08
SUBJECT: ACCOUNTING & BUDGET DATA
REPORT NUM: CLASS: C DRAWER: 5
CUSTODIAN: SMITH, D. W.
COMMENT: UTILITY CCST TO 9201-4, ANNUAL STANLEY COST
- N-41 AUTHOR:
TITLE: COST OF BOTTLING MERCURY DATE: 1969-08
SUBJECT: SPECIALIST'S PILE
REPORT NUM: CLASS: C DRAWER: 15) /
CUSTODIAN: SMITH, D. W.
COMMENT: UTILITY COST TO 9201-4, ANNUAL STANLEY COST

Y-41 AUTHOR: DATE: 1973-02-22
TITLE: 9201-1 ESTIMATE TO FABRICATE CONTAINERS
SUBJECT: MERCURY FLASK DATA
REPORT NUM: CLASS: U DRAWER: 8
CUSTODIAN: SMITH, D. W.
COMMENT:

Y-41 AUTHOR: DATE: 1973-02-22
TITLE: 9201-1 ESTIMATE TO FABRICATE CONTAINERS
SUBJECT: SPECIALIST'S FILE
REPORT NUM: CLASS: U DRAWER: 15
CUSTODIAN: SMITH, D. W.
COMMENT:

Y-43 AUTHOR: DATE:
TITLE: MERCURY INVENTORY
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: C DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: SOLVENT AND CASCADE SYSTEMS

Y-44 AUTHOR: SMITH, D. W. ET AL. DATE: 1963 - 1975
TITLE: SOLVENT INVENTORY CALCULATION - BOTTLING, LOADING, AND STIRRING MERCURY DATA
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT:

Y-45 AUTHOR: DATE: 1956 - 1957
TITLE: OLD SOLVENT INVENTORIES
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: S DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: ALPHA-4

Y-46 AUTHOR: DATE: 1956-1962
TITLE: SOLVENT CAPITALIZATION AND WRITE-OFF
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: CP
COMMENT: COMPILED OF INTERNAL MEMORANDA AND WORKSHEETS

Y-47 AUTHOR: DATE: 1957 - 1959
TITLE: ALLOY AND SOLVENT LOSS STUDIES
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: C DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: ALPHA-5

Y-48 AUTHOR: DATE: 1955-1964
TITLE: SOLVENT INVENTORY STATUS REPORTS
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: C DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: WORKSHEETS AND INTERNAL MEMORANDA

Y-49 AUTHOR: DATE: 1955-1959
TITLE: YCT SOLVENT
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT: COMPIRATION OF WORKSHEETS AND INTERNAL MEMORANDA

Y-50 AUTHOR: DATE: 1954-1965
TITLE: MERCURY PROCUREMENT AND RECEIPTS
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: C DRAWER: 5
CUSTODIAN: CP
COMMENT: COMPIRATION OF INVENTORY LISTS, STORAGE AND SHIPPING INFORMATION

Y-51 AUTHOR: SMITH, D. W. ET AL. DATE: 1967
TITLE: COLUMN INVENTORY DATA SHEETS 10/67 THRU 12/67
SUBJECT:
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: MERCURY SHIPMENT DATA

Y-53 AUTHOR: SMITH, D. W. DATE: 1957-1968
TITLE: SOLVENT RECOVERY AND BOTTLING LOGBOOK
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT:

4-54 AUTHOR: MCALISTER, R. J. DATE: 1970 - 1975
TITLE: COMPILATION FILE CP MERCURY-RELATED SUBJECTS AND CORRESPONDENCE
SUBJECT: MERCURY FLASK DATA
REPORT NUM: CLASS: U DRAWER: 8
CUSTODIAN: SMITH, D. W.
COMMENT: MERCURY RECOVERY, GSA REFLASKING, PURCHASE & SPECS, GSA STORAGE, AMENDED AGREEMENT 1974, MERCURY PURITY, PURCHASES AND SALES
INVENTORY DETAILS.

4-54 AUTHOR: KLOBE, J. S. DATE: 1970-12-07
TITLE: MERCURY RECOVERY, LETTER FROM J. S. KLOBE TO V. B. GRITZNER
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT: COST ESTIMATES

4-54 AUTHOR: KLCBE, J. S. DATE: 1970-12-07
TITLE: MERCURY RECOVERY, LETTER FROM J. S. KLCBE TO V. B. GRITZNER
SUBJECT: SPECIALIST'S FILES
REPORT NUM: CLASS: C DRAWER: 15 /
CUSTODIAN: SMITH, D. W.
COMMENT: COST ESTIMATES

4-54 AUTHOR: MCALISTER, R. J. DATE: 1971-06-03
TITLE: BUILDING 81-10, LETTER FROM R. J. MCALISTER TO J. R. BARKMAN
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT: MERCURY RECOVERY AMOUNTS

4-54 AUTHOR: MCALISTER, R. J. DATE: 1971-06-03
TITLE: BUILDING 81-10, LETTER FROM MCALISTER TO J. R. BARKMAN
SUBJECT: SPECIALIST'S FILES
REPORT NUM: CLASS: C DRAWER: 15 /
CUSTODIAN: SMITH, D. W.
COMMENT: MERCURY RECOVERY AMOUNTS

4-54 AUTHOR: METAL PREP DIV DATE: 1971-10-05
TITLE: METAL PREPARATION DIVISION PROCEDURE FOR ALPHA-5 PROCESSING DEPARTMENT
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: CLASS: C DRAWER: 10
CUSTODIAN: SMITH, D. W.
COMMENT:

Y-54 AUTHOR: METAL PREP DIV. DATE: 1971-10-05
TITLE: METAL PREPARATION DIVISION PROCEDURE FOR ALPHA-5 PROCESSING DEPARTMENT
SUBJECT: SPECIALIST'S FILES
REPORT NUM: CLASS: C DRAWER: 15
CUSTODIAN: SMITH, D. W. COMMENT:

Y-54 AUTHOR: SMITH, D. W. DATE: 1971-12-10
TITLE: MERCURY SALVAGE, LETTER FROM D. W. SMITH TO D. R. MCCANNON
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT: SAMPLE ANALYSIS

Y-54 AUTHOR: SMITH, D. W. DATE: 1971-12-10
TITLE: MERCURY SALVAGE, LETTER FROM D. W. SMITH TO D. R. MCCANNON
SUBJECT: SPECIALIST'S FILES
REPORT NUM: CLASS: C DRAWER: 15
CUSTODIAN: SMITH, D. W.
COMMENT: SAMPLE ANALYSIS

Y-54 AUTHOR: SMITH, D. W. DATE: 1972-01-24
TITLE: MERCURY SLUDGE, BLDG 8110
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: C DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: COSTS INVOLVED, MERCURY RECOVERY.

Y-54 AUTHOR: SMITH, D. W. DATE: 1972-01-24
TITLE: MERCURY SLUDGE, BLDG 8110.
SUBJECT: SPECIALIST'S FILES
REPORT NUM: CLASS: C DRAWER: 15
CUSTODIAN: SMITH, D. W.
COMMENT: COSTS INVOLVED, MERCURY RECOVERY.

Y-54 AUTHOR: SMITH, D. W. DATE: 1972-09-08
TITLE: QUESTIONNAIRE: MERCURY USAGE - Y12, CX 1971
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: C DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: DONALD ZUCKER. EXPLANATORY STATEMENT (QUES. 3G)

H-54 AUTHOR: DATE: 1972-09-08
TITLE: QUESTIONNAIRE: MERCURY USAGE - Y12, CY 1971
SUBJECT: SPECIALIST'S FILES CLASS: C DRAWER: 15
REPORT NUM: REPORT NUM: 15
CUSTODIAN: SMITH, D. W.
COMMENT: DONALD ZUCKER. EXPLANATORY STATEMENT (QUES. 3G)

H-54 AUTHOR: DATE: 1973-02-26
TITLE: STRIPPING, 9201-4
SUBJECT: SPECIALIST'S FILES CLASS: C DRAWER: 7
REPORT NUM: REPORT NUM: 7
CUSTODIAN: SMITH, D. W.
COMMENT: COSTS

H-54 AUTHOR: DATE: 1973-02-26
TITLE: STRIPPING, 9201-4
SUBJECT: SPECIALIST'S FILES CLASS: C DRAWER: 7
REPORT NUM: REPORT NUM: 7
CUSTODIAN: SMITH, D. W.
COMMENT: COSTS

H-54 AUTHOR: DATE: 1974-06-28
TITLE: MERCURY PURCHASES AND SALES, LETTER FROM H. D. HICKMAN TO D. K. GESTON
SUBJECT: SPECIALIST'S FILES CLASS: C DRAWER: 15
REPORT NUM: REPORT NUM: 15
CUSTODIAN: SMITH, D. W.
COMMENT: HISTORY OF OAK RIDGE MERCURY ACTIVITIES

H-54 AUTHOR: DATE: 1974-07-15
TITLE: MERCURY STORAGE, HANDLING AND RELATED SERVICES, LETTER FROM J. H. CASE TO H. E. HICKMAN
SUBJECT: SPECIALIST'S FILES CLASS: C DRAWER: 15
REPORT NUM: REPORT NUM: 15
CUSTODIAN: SMITH, D. W.
COMMENT: GS-00P-23195 (SCM)

H-54 AUTHOR: DATE: 1975-03-05
TITLE: GSA LEAKING PLASKS
SUBJECT: MERCURY FLASK DATA CLASS: C DRAWER: 8
REPORT NUM: REPORT NUM: 8
CUSTODIAN: SMITH, D. W.
COMMENT: MERCURY STORAGE

N-54 AUTHOR: DATE: 1975-03-05
TITLE: GSA LEAKING PLASKS
SUBJECT: SPECIALIST'S FILES
REPORT NUM: CLASS: C DRAWER: 15
CUSTODIAN: SMITH, D. W.
COMMENT: MERCURY STORAGE

N-55 AUTHOR: SMITH, D. W. DATE: 1971
TITLE: LOGBOOK OF MERCURY RECOVERED FFCM BLDG. 8110
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT:

N-56 AUTHOR: SMITH, D. W. DATE: 1968
TITLE: MERCURY BOTTLING RECORDS LCGBCCK
SUBJECT: MERCURY FLASK DATA
REPORT NUM: CLASS: U DRAWER: 8
CUSTODIAN: SMITH, D. W.
COMMENT:

N-57 AUTHOR: SMITH, D. W. DATE: 1965
TITLE: BOTTLING RECORD LOGBOOKS (2)
SUBJECT: MERCURY FLASK DATA
REPORT NUM: CLASS: U DRAWER: 8
CUSTODIAN: SMITH, D. W.
COMMENT:

N-58 AUTHOR: SMITH, D. W. DATE: 1975 - 1983
TITLE: COMPILATION FILE OF MERCURY-RELATED SUBJECTS AND CORRESPONDENCE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT: INVENTORY ADJUSTMENT, EXCESS, MERCURY SALE, MERCURY CLEANUP OPERATION.

N-59 AUTHOR: CROW, W. T. DATE: 1957-08-20
TITLE: MERCURY PHYSICAL PROPERTIES
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: SMITH, D. W.
COMMENT:

- Y-60 AUTHOR: DATE: 1952-1956
TITLE: MERCURY INVENTORY WORKSHEETS
SUBJECT: ACCOUNTING AND BUDGET DATA
REPRT NUM: CLASS: C DRAWER: 5
CUSTODIAN: CP
COMMENT: COMPILATION OF SUMMARY INFORMATION AND DETAILED INVENTORY WORKSHEETS
- Y-61 AUTHOR: DATE: 1959-1961
TITLE: TAILS FEED WEEKLY COMPOSITE WORKSHEETS
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: C DRAWER: 5
CUSTODIAN: CP
COMMENT: TAILS FEED DATA FOR PERIOD 3/15/59 THROUGH 1/8/61
- Y-61 AUTHOR: DATE: 1956 - 1958
TITLE: NEW SOLVENT INVENTORIES
SUBJECT: MERCURY SHIPMENT DATA
REPRT NUM: CLASS: U DRAWER: 15 /
CUSTODIAN: SMITH, D. W.
COMMENT: COMPILATION OF INVENTORY SHEETS AND CALCULATIONS
- Y-62 AUTHOR: DATE: 1967
TITLE: MERCURY INVENTORY PROCEDURE (ALPHA-4)
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT:
- Y-63 AUTHOR: DATE: 1958 - 1959
TITLE: SOLVENT INVENTORIES
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: COMPILATION OF WORKSHEETS AND INVENTORY DATA
- Y-64 AUTHOR: DATE: 1962
TITLE: MERCURY SHIPMENTS
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: COMPILATION

1-65 AUTHOR: SCLOVENT RECOVERY FACILITY
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: LOGSHEETS WITH AMOUNTS RECOVERED AND UNIT COST

1-66 AUTHOR: ALPHA-5 SOLVENT INVENTORIES
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: COMPIRATION OF INVENTORY SHEETS, WORKSHEETS, CALCULATIONS AND INTERNAL MEMORANDA

1-67 AUTHOR:
TITLE: CASCADE EVALUATION DATE: 1962 - 1963
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: S DRAWER: 5
CUSTODIAN: SMITH, D. W.
COMMENT: BUDGET DATA, COSTS.

1-68 AUTHOR: SOLVENT RECOVERY DATE: 1961-1962
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: WORKSHEETS OF QUANTITIES AND UNIT COSTS

1-69 AUTHOR: TAILS TO FEED RATIO CY 59, 60, 61 DATE: 1959 - 1961
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: CLASS: C DRAWER: 10
CUSTODIAN: SMITH, D. W.
COMMENT:

1-70 AUTHOR: COMPIRATION FILE OF MERCURY-RELATED SUBJECTS DATE: 1962 - 1963
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: WORK ORDER CHANGES, PROPOSED MERCURY STORAGE BUILDING.

1-71 AUTHOR: ANDERSON, J. S. DATE: 1956-1957
TITLE: SOLVENT SHIPMENTS, TRANSPERS, AND LCAS
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: CP
COMMENT: COMPIILATION OF ACCOUNTABILITY DATA ON MERCURY

1-72 AUTHOR: SMITH, D. W. ET AL. DATE: 1962
TITLE: SOLVENT BOTTLING AND STORAGE - WORK ORDER - HANDLING OF MERCURY AND MERCURY BOTTLES AEC - AUDIT REPORT
SUBJECT:
REPORT NUM: CLASS: C DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT:

1-73 AUTHOR: ANDERSON, J. S. DATE: 1978-09-25
TITLE: MERCURY PLASKING SYNOPSIS
SUBJECT: MERCURY PLASK DATA
REPORT NUM: CLASS: C DRAWER: 8
CUSTODIAN: SMITH, D. W.
COMMENT: SUMMARY OF PLASKING EFFORT STARTED IN SPRING OF 1976

1-74 AUTHOR: DATE: 1967
TITLE: COLUMN INVENTORY DATA SHEETS
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: C DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: COLUMN INVENTORY

1-75 AUTHOR: SMITH, D. W. DATE: 1977
TITLE: BOTTLING RECORD LOGBOOKS (2)
SUBJECT: MERCURY PLASKING DATA
REPORT NUM: CLASS: U DRAWER: 8
CUSTODIAN: SMITH, D. W.
COMMENT: DATA ON RECEIPTS, PUMPING, COLUMNS, SHIPPING, BOTTLING AND WEIGHTS

1-76 AUTHOR: DATE: 1959 - 1962
TITLE: COMPILATION FILE OF MERCURY-RELATED SUBJECTS AND CORRESPONDENCE
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: C DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: INVENTORY RECORDS

4-76 AUTHOR: DATE: 1959 - 1962
TITLE: COMPILATION FILE OF MERCURY-PFLATED SUBJECTS
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: C DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: INVENTORY 9201-4, ALPHA-4, ALPHA-5.

4-76 AUTHOR: DATE: 1960
TITLE: COLEX SOLVENT INVENTORY RECORD
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: C DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: LOSS COMMENT

4-76 AUTHOR: DATE: 1962-09-06
TITLE: COLEX SOLVENT INVENTORY, LETTER FROM N. DOW TO H. P. SCHMIDT
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT: ALPHA-4, ALPHA-5, PHYSICAL INVENTORY 8/29/62, SHORTAGE COMMENT.

4-77 AUTHOR: DATE: 1957-1958
TITLE: FEED CHANGES - ALPHA 4 CASCADES
SUBJECT: PRODUCTION OPERATING RECORDS
REPORT NUM: CLASS: C DRAWER: 12
CUSTODIAN: SMITH, D. W.
COMMENT: LOGBOOK

4-78 AUTHOR: DATE: 1956 - 1968
TITLE: COMPILATION OF MERCURY-RELATED SUBJECTS AND CORRESPONDENCE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: SMITH, D. W.
COMMENT: EXCESS, PURITY, SPECTROGRAPHIC REPCRI.

4-78 AUTHOR: DATE: 1962-11-13
TITLE: Y-12 EXCESS MERCURY
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: AEC REQUEST RE PURITY LEVEL

1-79 AUTHOR: DATE: 1957
TITLE: SOLVENT
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: C DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: INVENTORY, 9101-5.

1-79 AUTHOR: EVANS, G. W. DATE: 1957-08-09
TITLE: SOLVENT INVENTORY, LETTER FROM G. W. EVANS TO R. A. WALKER
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT: SUMMARY, 9201-5

1-79 AUTHOR: EVANS, G. W. DATE: 1957-08-09
TITLE: SOLVENT INVENTORY, LETTER FROM G. W. EVANS TO R. A. WALKER
SUBJECT: SPECIALIST'S FILES
REPORT NUM: CLASS: C DRAWER: 15
CUSTODIAN: SMITH, D. W.
COMMENT: SUMMARY, 9201-5

1-80 AUTHOR: DATE: 1958
TITLE: CARBON APPARATUS PROCEDURE
SUBJECT: TECHNICAL REPORTS
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT: APPARATUS TO ANALYZE FLUE GASES LEAVING SOLVENT ROASTER

1-80 AUTHOR: DATE: 1958
TITLE: SOLVENT ROASTER PROCEDURE
SUBJECT: TECHNICAL REPORTS
REPORT NUM: CLASS: C DRAWER: 10
CUSTODIAN: CP
COMMENT: ROASTER IN 8110 TO RECOVER PURE SOLVENT FROM SOLVENT OXIDE

1-81 AUTHOR: DATE: 1962-09-26
TITLE: COLEX SOLVENT INVENTORY RECORD
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: C DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: PHYSICAL INVENTORY 9/26/62, SHORTAGE COMMENT.

- 1-81 AUTHOR: DATE: 1970
TITLE: COMPILATION FILE OF MERCURY-RELATED SUBJECTS AND CORRESPONDENCE
SUBJECT: SPECIALIST FILES
REPORT NUM: CLASS: C DRAWER: 10
CUSTODIAN: SMITH, D. W.
COMMENT: INVENTORY DATA, STORAGE TANKS, ALPHA-4, REBOTTLING ACCOUNTABILITY PROCEDURE.
- 1-91 AUTHOR: DATE: 1970-05-13
TITLE: ALPHA-4 INSPECTION PROCEDURE
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: SMITH, D. W.
COMMENT: A-5 AP 06. 10
- 1-81 AUTHOR: DATE: 1971-09
TITLE: STORAGE OF MERCURY
SUBJECT: PLASK DATA
REPORT NUM: CLASS: U DRAWER: 8
CUSTODIAN: SMITH, D. W.
COMMENT: PROCEDURES
- 1-81 AUTHOR: HICKMAN, H. D. DATE: 1973-12-14
TITLE: MERCURY REQUIREMENTS, LETTER FROM H. D. HICKMAN (ABC) TO J.M. CASE (UCC)
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: AEC EXCESS
- 1-81 AUTHOR: HICKMAN, H. D. DATE: 1973-12-14
TITLE: MERCURY REQUIREMENTS, LETTER FROM H.D. HICKMAN (AEC) TO J.M. CASE (UCC)
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: (ALSO M-384, -477)
- 1-81 AUTHOR: LAWRENCE, J. B. DATE: 1974-05-09
TITLE: QUALITY OF MERCURY SOLD. LETTER FROM J.B. LAWRENCE (BETHLEHEM APPARATUS CO.) TO G. GAUTH (ASSO. METALS)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT: DETERIORATION OF QUALITY

- Y-91 AUTHOR: BARTH, G. D. DATE: 1974-05-14
TITLE: QUALITY OF MERCURY SOLD, LETTER FROM G.D. BARTH (ASSOC. METALS AND CHEM. CO.) TO DUHLBERG (GSA)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: SMITH, D. W.
COMMENT: BETHLEHEM APPARATUS COMPANY - J.B. LAWRENCE
- Y-91 AUTHOR: GARNER, L. J. DATE: 1974-05-31
TITLE: MEACURY PURITY, LETTER FROM LECN J. GARNER (AEC) TO A.L. MAYFIELD (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: SMITH, D. W.
COMMENT: DEFENSE DEPOT, MEMPHIS
- Y-91 AUTHOR: MAYFIELD, A. L. DATE: 1975-03-13
TITLE: REFLASKING OF GSA MERCURY, LETTER FRM A.L. MAYFIELD (AEC) TO PROPERTY BRANCH FILES
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: SMITH, D. W.
COMMENT: FLASK SPECIFICATIONS, E.H. JOHNSON COPY (UCC)
- Y-91 AUTHOR: DOW, N. DATE: 1975-04-18
TITLE: MERCURY IN ALPHA 4, LETTER FRM N. DOW TO E.H. JOHNSON
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: SMITH, D. W.
COMMENT: PHYSICAL CHECK
- Y-91 AUTHOR: SMITH, D. W. DATE: 1975-04-25
TITLE: BOTTLING COSTS OF MERCURY, LETTER FROM D.W. SMITH TO V.B. GRITZNER
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: SMITH, D. W.
COMMENT: INFO REQUIRED FOR MERCURY BOTTLING ESTIMATE, 9201-4
- Y-91 AUTHOR: SPEAGUE, T.P. DATE: 1975-05-08
TITLE: CHEMICALLY CLEANING OF MERCURY BOTTLES, LETTER FROM T.P. SPRAGUE TO MEAL DOW
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: SMITH, D. W.
COMMENT: CLEANING OF MERCURY BOTTLES

- Y-82 AUTHOR: DATE: 1964 - 1968
TITLE: MERCURY TRANSFER RECEIPTS
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: COMPILATION OF RECEIPTS SHOWING PALLET AND FLASK NUMBERS
- Y-83 AUTHOR: BAUMANN, W. H. DATE: 1953
TITLE: MERCURY URINALYSIS
SUBJECT: HEALTH RECORDS
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN: WEST, C. H.
COMMENT:
- Y-83 AUTHOR: DATE: 1956-1960
TITLE: SOLVENT INVENTORY
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: C DRAWER: 5
CUSTODIAN: CF
COMMENT: COMPILATION OF INVENTORIES AND RELATED INFORMATION
- Y-84 AUTHOR: DATE: 1964 - 1966
TITLE: MERCURY INVENTORIES
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: COMPILATION OF WORKSHEETS
- Y-84 AUTHOR: DATE: 1964-1966
TITLE: MERCURY INVENTORIES
SUBJECT: SPECIALIST'S FILES
REPORT NUM: CLASS: U DRAWER: 15
CUSTODIAN: SMITH, D. W.
COMMENT: HANDWRITTEN DRAFTS. RECORDS. 9201-5. 9201-4
- Y-85 AUTHOR: SMITH, D. W. DATE: 1956 - 1961
TITLE: VOLTS AND TEMPERATURE
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: SMITH, D. W.
COMMENT: COMPILATION OF ANALYTICAL REPORTS, GRAPHS, AND WORKSHEETS

- 4-85 AUTHOR: SMITH, D. W. DATE: 1960 - 1961
TITLE: D. C. GEN. BRUSHES
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: SMITH, D. W.
COMMENT: COMPILATION OF BRUSH DATA, SPECTROGRAPHIC REPORTS, AND CASCADE 9 DATA SHEETS
- 4-85 AUTHOR: SMITH, D. W. DATE: 1961
TITLE: CASCADE PIPING CHANGES
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: SMITH, D. W.
COMMENT: COMPILATION OF DRAWINGS AND OPERATING PROCEDURES
- 4-86 AUTHOR: DATE: 1957-01 1957-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JAN-MARCH, 1957
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1017 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:
- 4-87 AUTHOR: DATE: 1957-04 1957-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1957
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1018 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:
- 4-88 AUTHOR: DATE: 1957-07 1957-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPT, 1957
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1019 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:
- 4-89 AUTHOR: DATE: 1957-10 1957-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCT-DEC, 1957
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1020 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

1-91 AUTHOR: BENNETT, W. K. DATE: 1953-07 1954-06
TITLE: STATUS REPORT ON THE COLEX PROCESS JULY, 1953 - JUNE, 1954
SUBJECT: TECHNICAL REPORT
REPORT NUM: Y-1084 CLASS: 0 DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-91 AUTHOR: HIBBITS, J. O. DATE: 1954-12
TITLE: ELECTROCHEMICAL STUDY OF THE LITHIUM AMALGAM-LITHIUM HYDROXIDE SYSTEM
SUBJECT: TECHNICAL REPORT
REPORT NUM: Y-1085 CLASS: 0 DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-92 AUTHOR: DATE: 1955-06
TITLE: FINAL REPORT IN EVAPORATOR FEED TANK BUILDING 9201-4, Y-12 PLANT, JUNE 17, 1955
SUBJECT: TECHNICAL REPORT
REPORT NUM: Y-1094 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-93 AUTHOR: DATE: 1954-07 1955-06
TITLE: STATUS REPORT OF THE COLEX PROCESS COVERING THE PERIOD FROM JULY, 1954 - JUNE, 1955
SUBJECT: TECHNICAL REPORT
REPORT NUM: Y-1117 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-94 AUTHOR: DATE: 1956-02
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR FEB, 1956
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1121 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

1-95 AUTHOR: DATE: 1956-03
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR MARCH, 1956
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1122 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-96 AUTHOR: DATE: 1956-04
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR APRIL, 1956
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1123 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-97 AUTHOR: DATE: 1956-05
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR MAY 1956
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1124 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-98 AUTHOR: DATE: 1956-06
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR JUNE, 1956
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1125 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-99 AUTHOR: DATE: 1956-07
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR JULY, 1956
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1126 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-100 AUTHOR: DATE: 1956-08
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR AUG, 1956
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1127 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-101 AUTHOR: DATE: 1956-09
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR SEPT, 1956
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1128 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-102 AUTHOR: DATE: 1956-10
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR OCT, 1956
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1129 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-103 AUTHOR: DATE: 1956-11
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR NOV, 1956
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1130 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-104 AUTHOR: DATE: 1956-12
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR DEC, 1956
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1131 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-105 AUTHOR: LEVEY, F. P. DATE: 1956-07
TITLE: THE RELATIONSHIP BETWEEN AMALGAM AND AMALGAM FLOW IN OPERATING INCLINED PLANE AMALGAM CELLS WITH SLOPE VARIABLE
SUBJECT: TECHNICAL REPORT
REPORT NUM: Y-1135 CLASS: C DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-106 AUTHOR: DATE: 1957-01
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR JAN, 1957
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1161 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-107 AUTHOR: DATE: 1957-02
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR FEB, 1957
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1161 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-108 AUTHOR: DATE: 1957-03
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR MARCH, 1957
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1162 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-109 AUTHOR: DATE: 1957-04
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR APRIL, 1957
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1163 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-110 AUTHOR: DATE: 1957-05
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR MAY, 1957
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1164 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-111 AUTHOR: DATE: 1957-06
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR JUNE, 1957
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1165 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-112 AUTHOR: DATE: 1957-07
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR JULY, 1957
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1166 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-113 AUTHOR: DATE: 1957-08
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR AUG, 1957
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1167 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-114 AUTHOR: DATE: 1957-09
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR SEPT. 1957
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-116A CLASS: S DRAWER: 3
CUSTODIAN: CP COMMENT:

Y-115 AUTHOR: DATE: 1957-10
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR OCT. 1957
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1169 CLASS: S DRAWER: 3
CUSTODIAN: CP COMMENT:

Y-116 AUTHOR: DATE: 1957-11
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR NOV. 1957
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1170 CLASS: S DRAWER: 3
CUSTODIAN: CP COMMENT:

Y-117 AUTHOR: DATE: 1957-12
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR DEC. 1957
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1171 CLASS: S DRAWER: 3
CUSTODIAN: CP COMMENT:

Y-118 AUTHOR: KRIEG, A DATE: 1957-07
TITLE: FACTORS AFFECTING RESULTS IN THE ROUTINE METHOD FOR DETERMINATION OF THE STABILITY OF LITHIUM ALGAE IN CONTACT WITH AQUEOUS
SUBJECT: LITHIUM HYDROXIDE SOLUTIONS
REPORT NUM: Y-1174 CLASS: C DRAWER: 10
CUSTODIAN: CP COMMENT:

Y-120 AUTHOR: STILES, C. J. DATE: 1958-01
TITLE: COLEX PRODUCT REFLUX-CATALYSTS AND EQUIPMENT
SUBJECT: TECHNICAL REPORT
REPORT NUM: Y-1189 CLASS: S DRAWER: 10
CUSTODIAN: CP COMMENT:

Y-121 AUTHOR: DATE: 1958-01 1958-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JAN-MARCH, 1958
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1200 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

Y-122 AUTHOR: DATE: 1958-04 1958-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1958
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1201 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

Y-123 AUTHOR: DATE: 1958-07 1958-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPT, 1958
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1202 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

Y-124 AUTHOR: DATE: 1958-10 1958-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCT-DEC, 1958
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1203 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

Y-125 AUTHOR: DATE: 1959-01 1959-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JAN-MARCH, 1959
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1204 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

Y-126 AUTHOR: DATE: 1959-04 1959-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1959
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1205 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

4-127 AUTHOR: DATE: 1959-07 1959-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPT, 1959
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1206 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

4-128 AUTHOR: DATE: 1959-10 1959-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCT-DEC, 1959
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1207 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

4-129 AUTHOR: DATE: 1960-01 1960-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JAN-MARCH, 1960
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1208 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

4-130 AUTHOR: DATE: 1960-04 1960-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1960
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1209 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

4-131 AUTHOR: DATE: 1960-07 1960-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPT, 1960
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1210 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

4-132 AUTHOR: DATE: 1960-10 1960-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCT-DEC, 1960
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1211 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

N-133 AUTHOR: DATE: 1961-01 1961-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JAN-MARCH, 1961
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1212 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

N-134 AUTHOR: DATE: 1961-04 1961-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1961
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1213 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

N-135 AUTHOR: DATE: 1961-07 1961-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPT, 1961
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1214 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

N-136 AUTHOR: DATE: 1961-10 1961-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCT-DEC, 1961
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1215 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

N-137 AUTHOR: DATE: 1962-01 1962-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JAN-MARCH, 1962
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1216 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

N-138 AUTHOR: DATE: 1962-04 1962-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1962
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1217 CLASS: S DRAWER: 1
CUSTODIAN: CP
COMMENT:

N-139 AUTHOR: DATE: 1962-07 1962-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPTEMBER, 1962
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1218 CLASS: S DRAWER: 2
CUSTODIAN: CF
COMMENT:

N-140 AUTHOR: DATE: 1962-10 1962-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCTOBER-DECEMBER, 1962
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1219 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

N-141 AUTHOR: DATE: 1963-01 1963-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JANUARY-MARCH, 1963
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1220 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

N-142 AUTHOR: DATE: 1958-01
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR JAN, 1958
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1221 CLASS: S DRAWER: 3
CUSTODIAN: CF
COMMENT:

N-143 AUTHOR: DATE: 1958-02
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR FEB, 1958
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1222 CLASS: S DRAWER: 3
CUSTODIAN: CF
COMMENT:

N-144 AUTHOR: DATE: 1958-03
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR MARCH, 1958
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1223 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-145 AUTHOR: DATE: 1958-04
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR APRIL, 1958
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1224 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-145 AUTHOR: DATE: 1958-04
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR APRIL, 1958
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1224 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-146 AUTHOR: DATE: 1958-05
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR MAY, 1958
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1225 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-147 AUTHOR: DATE: 1958-06
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR JUNE, 1958
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1226 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-148 AUTHOR: DATE: 1958-07
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR JULY, 1958
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1227 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

Y-149 AUTHOR: DATE: 1958-08
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR AUG, 1958
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1228 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

4-150 AUTHOR: DATE: 1958-09
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR SEPT 1958
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1229 CLASS: S DRAWER: 3
CUSTODIAN: CF
COMMENT:

4-151 AUTHOR: DATE: 1958-10
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR OCT, 1958
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1230 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

4-152 AUTHOR: DATE: 1958-11
TITLE: TECHNICAL DIVISION MONTHLY PROGRESS REPORT FOR NOV, 1958
SUBJECT: TECHNICAL MONTHLY PROGRESS REPORT, Y-12 TECHNICAL DIVISION
REPORT NUM: Y-1231 CLASS: S DRAWER: 3
CUSTODIAN: CP
COMMENT:

4-153 AUTHOR: DATE: 1958-12
TITLE: Y-12 PLANT MONTHLY PROGRESS REPORT DEC., 1958
SUBJECT: MONTHLY PROGRESS REPORT, Y-12 PLANT
REPORT NUM: Y-1232 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

4-154 AUTHOR: JOHNSON, F. W. DATE: 1958-05
TITLE: INSTRUMENT AND METHOD FOR RAPID AMALGAM STABILITY DETERMINATION
SUBJECT: TECHNICAL REPORT
REPORT NUM: Y-1238 CLASS: C DRAWER: 10
CUSTODIAN: CP
COMMENT:

4-155 AUTHOR: BEZIK, M. J. DATE: 1958-08
TITLE: ISOTOPE SEPARATION FACTOR FOR THE SYSTEM: LITHIUM AMALGAM-AQUEOUS LITHIUM HYDROXIDE
SUBJECT: TECHNICAL REPORT
REPORT NUM: Y-1239 CLASS: C DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-157 AUTHOR: DATE: 1959-12 1960-10
TITLE: Y-12 TECHNICAL PROGRESS REPORT - SECOND QUARTER, FY 1960 OCT - DEC 1959
SUBJECT: QUARTERLY TECHNICAL PROGRESS REPORT, Y-12 PLANT
REPORT NUM: Y-1268 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-158 AUTHOR: SCHIMMEL, P. A. DATE: 1959-12
TITLE: DEVELOPMENT OF A ROTATING CATHODE MERCURY-MAKER
SUBJECT: TECHNICAL REPORT
REPORT NUM: Y-1284 CLASS: S DRAWER: 10
CUSTODIAN: CF
COMMENT:

Y-159 AUTHOR: SCHIMMEL, P. A. DATE: 1960-01
TITLE: REDUCTION CELL WITH VERTICAL ROTATION MERCURY CATHODE
SUBJECT: TECHNICAL REPORT
REPORT NUM: Y-1285 CLASS: U DRAWER: 10
CUSTODIAN: CF
COMMENT:

Y-160 AUTHOR: DATE: 1963-04 1963-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1963
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1421 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-161 AUTHOR: DATE: 1963-07 1963-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPTEMBER, 1963
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1422 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-162 AUTHOR: DATE: 1963-10 1963-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCTOBER-DECEMBER, 1963
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1423 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-163 AUTHOR: DATE: 1964-01 1964-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JANUARY-MARCH, 1964
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1424 CLASS: S DRAWER: 2
CUSTODIAN: CF
COMMENT:

Y-164 AUTHOR: DATE: 1964-04 1964-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1964
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1425 CLASS: S DRAWER: 2
CUSTODIAN: CF
COMMENT:

Y-165 AUTHOR: DATE: 1964-07 1964-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPTEMBER, 1964
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1426 CLASS: S DRAWER: 2
CUSTODIAN: CF
COMMENT:

Y-166 AUTHOR: DATE: 1964-10 1964-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCTOBER-DECEMBER, 1964
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1427 CLASS: S DRAWER: 2
CUSTODIAN: CF
COMMENT:

Y-167 AUTHOR: DATE: 1965-01 1965-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JANUARY-MARCH, 1965
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1428 CLASS: S DRAWER: 2
CUSTODIAN: CF
COMMENT:

Y-168 AUTHOR: DATE: 1965-04 1965-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1965
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1429 CLASS: S DRAWER: 2
CUSTODIAN: CF
COMMENT:

M-169 AUTHOR: Y-12 PLANT QUARTERLY REPORT, JULY-SEPTEMBER, 1965-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPTEMBER, 1965-09
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1430 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

M-170 AUTHOR: Y-12 PLANT QUARTERLY REPORT, OCTOBER-DECEMBER, 1965-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCTOBER-DECEMBER, 1965-12
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1511 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

M-171 AUTHOR: Y-12 PLANT QUARTERLY REPORT, JANUARY-MARCH, 1966-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JANUARY-MARCH, 1966-03
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1512 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

M-172 AUTHOR: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1966
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1966
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1513 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

M-173 AUTHOR: Y-12 PLANT QUARTERLY REPORT, JULY-SEPTEMBER, 1966-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPTEMBER, 1966-09
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1514 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

M-174 AUTHOR: Y-12 PLANT QUARTERLY REPORT, OCTOBER-DECEMBER, 1966-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCTOBER-DECEMBER, 1966-12
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1515 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-175 AUTHOR: DATE: 1967-01 1967-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JANUARY-MARCH, 1967
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1516 CLASS: S DRAWER: 2
CUSTODIAN: CF
COMMENT:

Y-176 AUTHOR: DATE: 1967-04 1967-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1967
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1517 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-177 AUTHOR: DATE: 1967-07 1967-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPTEMBER, 1967
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1518 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-178 AUTHOR: DATE: 1967-10 1967-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCTOBER-DECEMBER, 1967
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1519 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-179 AUTHOR: DATE: 1968-01 1968-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JANUARY-MARCH, 1968
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1520 CLASS: S DRAWER: 2
CUSTODIAN: CF
COMMENT:

Y-180 AUTHOR: DATE: 1968-04 1968-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1968
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1631 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-181 AUTHOR: DATE: 1968-07 1968-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPTEMBER, 1968
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1632 CLASS: S DRAWER: 2
CUSTODIAN: CF
COMMENT:

Y-182 AUTHOR: DATE: 1968-10 1968-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCTOBER-DECEMBER, 1968
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1633 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-183 AUTHOR: DATE: 1969-01 1969-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JANUARY-MARCH, 1969
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1634 CLASS: S DRAWER: 2
CUSTODIAN: CF
COMMENT:

Y-184 AUTHOR: DATE: 1969-04 1969-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1969
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1635 CLASS: S DRAWER: 2
CUSTODIAN: CF
COMMENT:

Y-185 AUTHOR: DATE: 1969-07 1969-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPTEMBER, 1969
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1636 CLASS: S DRAWER: 2
CUSTODIAN: CF
COMMENT:

Y-186 AUTHOR: DATE: 1969-10 1969-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCTOBER-DECEMBER, 1969
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1637 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

H-187 AUTHOR: DATE: 1970-01 1970-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JANUARY-MARCH, 1970
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1638 CLASS: S DRAWER: 2
CUSTODIAN: CF
COMMENT:

Y-188 AUTHOR: DATE: 1970-04 1970-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1970
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1639 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-189 AUTHOR: DATE: 1970-07 1970-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPTEMBER, 1970
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1640 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-190 AUTHOR: DATE: 1973-04 1973-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1973
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1770 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-191 AUTHOR: DATE: 1970-10 1970-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCTOBER-DECEMBER, 1970
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1760 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

H-192 AUTHOR: DATE: 1971-01 1971-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JANUARY-MARCH, 1971
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1761 CLASS: S DRAWER: 2
CUSTODIAN: CF
COMMENT:

4-193 AUTHOR: DATE: 1971-04 1971-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1971
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1762 CLASS: S DRAWER: 2
CUSTODIAN: CF
COMMENT:

4-194 AUTHOR: DATE: 1973-01 1973-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JANUARY-MARCH, 1973
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1769 CLASS: S DRAWER: 2
CUSTODIAN: CF
COMMENT:

4-195 AUTHOR: DATE: 1953-1957
TITLE: SOLVENT CHARGES, OCTOBER 1953 THROUGH 1957
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: C DRAWER: 5
CUSTODIAN: HOPPE, W. C.
COMMENT: COMPILATION OF CHARGES TO OPERATIONS, LOSSES, AND TRANSFERS

4-196 AUTHOR: DATE: 1958-1969
TITLE: SOLVENT ACCOUNTING AND BUDGET DATA
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: C DRAWER: 5
CUSTODIAN: HOPPE, W. C.
COMMENT: COMPILATION OF CORRESPONDENCE AND WORKSHEETS

4-197 AUTHOR: DATE: 1973-10 1973-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCTOBER-DECEMBER, 1973
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1892 CLASS: S DRAWER: 2
CUSTODIAN: CF
COMMENT:

4-198 AUTHOR: DATE: 1964-08 1964-10
TITLE: Y-12 TECHNICAL PROGRESS REPORT PART D - LABORATORY AUG - OCT 1964
SUBJECT: QUARTERLY TECHNICAL PROGRESS REPORT, Y-12 PLANT
REPORT NUM: Y-1436-D CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

N-199 AUTHOR: DATE: 1963-08 1963-10
TITLE: Y-12 TECHNICAL PROGRESS REPORT PART B - LITHIUM, CERAMICS, AND PLASTICS
SUBJECT: QUARTERLY TECHNICAL PROGRESS REPORT
REPORT NUM: Y-1432-B CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

1-200 AUTHOR: DATE: 1966-08 1966-10
TITLE: Y-12 TECHNICAL PROGRESS REPORT (U) PART E - CHEMISTRY AUG - OCT 1966
SUBJECT: QUARTERLY TECHNICAL PROGRESS REPORT, Y-12 PLANT
REPORT NUM: Y-1524-E CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-201 AUTHOR: DATE: 1966-05 1966-07
TITLE: Y-12 TECHNICAL PROGRESS REPORT PART E - CHEMISTRY MAY - JULY 1966
SUBJECT: QUARTERLY TECHNICAL PROGRESS REPORT, Y-12 PLANT
REPORT NUM: Y-1523-E CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-202 AUTHOR: DATE: 1967-02 1967-04
TITLE: Y-12 TECHNICAL PROGRESS REPORT PART D - LABORATORY - FEB-APRIL 1967
SUBJECT: QUARTERLY TECHNICAL PROGRESS REPORT, Y-12 PLANT
REPORT NUM: Y-1526-D CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-203 AUTHOR: DATE: 1967-02 1967-10
TITLE: Y-12 TECHNICAL PROGRESS REPORT PART D - LABORATORY AUG - OCT 1967
SUBJECT: QUARTERLY TECHNICAL PROGRESS REPORT, Y-12 PLANT
REPORT NUM: Y-1528-D CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-204 AUTHOR: DATE: 1967-08 1967-10
TITLE: Y-12 TECHNICAL PROGRESS REPORT PART E - CHEMISTRY AUG-OCT 1967
SUBJECT: QUARTERLY TECHNICAL PROGRESS REPORT, Y-12 PLANT
REPORT NUM: Y-1528-E CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-205 AUTHOR: WHITE, L. E. DATE: 1980-05
TITLE: DETERMINATION OF MERCURY IN ROCKS, SEDIMENTS, AND SOIL BY FLAMELESS ATOMIC ABSORPTION
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y/DK-254 CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-206 AUTHOR: SMITHWICK, R. W. DATE: 1980-03
TITLE: DETAILED PORE-VOLUME CALCULATIONS FOR MERCURY POROSIMETRY
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y/DK-249 CLASS: C DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-207 AUTHOR: HAFNER, W. L. DATE: 1955-01 1957-10
TITLE: A SUMMARY HISTORY OF COLEY OPERATIONS IN ALPHA-5 JAN, 1955 - OCT, 1957
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-F46-49 CLASS: S DRAWER: 10
CUSTODIAN: CF
COMMENT:

Y-207 AUTHOR: MOORE, W. C. DATE: 1955-09
TITLE: PRELIMINARY DESIGN AND COSTS FOR PROPOSED ALLOY PRODUCTION FACILITIES
SUBJECT: TECHNICAL REPORT
REPORT NUM: Y-1099 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-207 AUTHOR: CENTER, C. E. DATE: 1956-01
TITLE: EVALUATION OF IMPROVEMENT PROGRAM FOR COLEY FACILITIES
SUBJECT: TECHNICAL MEMO
REPORT NUM: LXXXIV-4996 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-207 AUTHOR: CENTER, C. E. DATE: 1956-06
TITLE: LONG TERM ADP PLANNING LETTER FROM C. E. CENTER (UCC) TO S. B. SAPIRIS (AEC)
SUBJECT: TECHNICAL MEMO
REPORT NUM: LXXXIV-5279 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-207 AUTHOR: BLUMKIN, S. DATE: 1957-05
TITLE: ADD PROGRAM AT Y-12, SURVEY AND LONG-RANGE PLANNING
SUBJECT: TECHNICAL MEMO
REPORT NUM: LXXIV-5972 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-207 AUTHOR: DOW, NEAL DATE: 1961-02
TITLE: MAXIMUM PRODUCTION CAPABILITY FOR FULL AND PARTIAL OPERATION OF COLEX FACILITIES - CASE STUDIES
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-F42-120 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-208 AUTHOR: MERCURY RECOEDS DATE: 1954-1977
TITLE: MERCURY RECOEDS
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: C DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: COMPILED OF SHIPPING ORDERS, SOLVENT COSTS, AND MATERIALS FOR ALPHA-5

Y-209 AUTHOR: PAYNE DATE: 1949-04-26
TITLE: SOLVENT STORAGE BUILDING
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: C DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT:

Y-210 AUTHOR: MERCURY ADJUSTMENT DATE: 1978-09-22
TITLE: MERCURY ADJUSTMENT
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: C DRAWER: 5
CUSTODIAN: WALDROP, R. P.
COMMENT:

Y-211 AUTHOR: COLEX EXPERIMENTATION DATE: 1953
TITLE: COLEX EXPERIMENTATION
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: C DRAWER: 5
CUSTODIAN: MARROW, G. B.
COMMENT:

M-212 AUTHOR: SMITH, D. W. ET AL. DATE: 1963-03-21
TITLE: MERCURY (SOLVENT) INVENTORY 9201-4, 1963 AND 1966
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT:

4-213 AUTHOR: DATE: 1954-1963
TITLE: SOLVENT MATERIALS FOR ALPHA-5 PROJECT
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: C DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: COMPILATION OF PROPERTY RECORD CARDS, RECEIVING REPORTS, AND ACCOUNTING MEMORANDA

4-214 AUTHOR: DATE: 1958-1967
TITLE: MERCURY DATA (BOTTLING DETAILS)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: INVENTORY AND CONDITION OF FLASKS

4-215 AUTHOR: DATE: 1955-02
TITLE: SOLVENT MATERIAL ACCOUNTING AND BUDGET DATA
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: TRANSFER SOLVENT MATERIALS

4-216 AUTHOR: KELLER, C. A. DATE: 1969-09
TITLE: STUDY OF MERCURY INVENTORY REQUIREMENTS
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: UCC-ND-87 CLASS: S DRAWER: 5
CUSTODIAN: KELLER, C. A.
COMMENT:

M-216 AUTHOR: VANSTRUM, P. R. DATE: 1969-09-05
TITLE: STUDY OF MERCURY INVENTORY REQUIREMENTS, LETTER FROM P. R. VANSTRUM (UCC) TO C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: UCC-ND-87 CLASS: S DRAWER: 17
CUSTODIAN: WILLIAMS, R. D.
COMMENT: PRODUCTION CAPABILITY OF ALPHA-4 EXAMINED IN VARIOUS OPERATING MODES.

M-217 AUTHOR: HIBBS, P. P. DATE: 1964-05-01
TITLE: AVAILABILITY OF EXCESS MERCURY. LETTER FROM R. P. HIBBS (UCC) TO C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE-EXTERNAL
REPORT NUM: Y-AA-286 CLASS: S DRAWER: 17
CUSTODIAN: CP
COMMENT: NUMERICAL DATA ON DISPOSAL OF MERCURY FLASKS

M-218 AUTHOR: KELLER, C. A. DATE: 1969-08-12
TITLE: STUDY OF MERCURY INVENTORY REQUIREMENTS. LETTER FROM C. A. KELLER (AEC) TO P. R. VANSTRUM (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: ORO147469 CLASS: S DRAWER: 17
CUSTODIAN: CP
COMMENT: NUMERICAL DATA ON MERCURY INVENTORY REQUIRED FOR STARTUP OF ALPHA-4 (ALSO M-481)

M-220 AUTHOR: HICKMAN, H. D. DATE: 1973-04-06
TITLE: MERCURY REQUIREMENTS, LETTER FROM H. E. HICKMAN (AEC) TO J. H. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: ORO147469 CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: AEC APPROVAL TO SUPPLY FLASKS OF MERCURY FROM ALPHA-4 FOR OTHER AEC PROGRAMS. (ALSO M-384)

M-221 AUTHOR: LENHARD, J. A. DATE: 1973-07-05
TITLE: DISPOSAL OF CLASSIFIED WASTES. LETTER FROM J. A. LENHARD (AEC-ORO) TO R. BULCOCK (AEC-KANSAS CITY)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: ORO147469 CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: APPROVAL FOR BURIAL OF SOLID WASTES AT Y-12

M-222 AUTHOR: HINES, C. R. DATE: 1973-08-24
TITLE: COSTS OF DECONTAMINATING MERCURY STORAGE FACILITY AT Y-12. LETTER FROM C. R. HINES (UCC) TO R. H. MCGLASSON (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: ORO147469 CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT:

M-223 AUTHOR: HICKMAN, H. D. DATE: 1973-12-14
TITLE: MERCURY REQUIREMENTS, LETTER FROM H. E. HICKMAN (AEC) TO J. H. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: ORO147469 CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: ERDA APPROVAL TO SUPPLY FLASKS OF MERCURY FROM ALPHA-4 STANDBY INVENTORY FOR AEC PROGRAMS

- H-220 AUTHOR: MUZZALLI, C. E. DATE: 1974-08-19
TITLE: ALPHA-4 STIPPING STUDY BY C. E. MUZZALLI
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HOPPE, W. C.
COMMENT: STRIPPING COST, VALUE OF MATERIALS, USE OF ALPHA-4, ENVIRONMENTAL IMPACT STUDIES
- I-220 AUTHOR: HICKMAN, H. D. DATE: 1974-10-11
TITLE: REFLASKING OF GSA MERCURY, LETTER FROM H. D. HICKMAN (AEC) TO J. H. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HOPPE, W. C.
COMMENT: GSA AUTHORIZATION FOR PROCUREMENT OF NEW FLASKS (ALSO H-382)
- I-220 AUTHOR: WHELIHAN, A. S. DATE: 1975-02-27
TITLE: REFLASKING OF LEAKING MERCURY FLASKS, LETTER FROM A. S. WHELIHAN (GSA) TO SUPPLY DIVISION DIRECTOR (ERDA)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HOPPE, W. C.
COMMENT: ADDITIONAL INFORMATION ON REFLASKING AND STORAGE OF MERCURY FLASKS AUTHORIZED IN GSA LETTER OF OCTOBER 23, 1974 (ALSO H-1)
- H-220 AUTHOR: HICKMAN, H. D. DATE: 1975-03-05
TITLE: REFLASKING OF LEAKING MERCURY FLASKS, LETTER FROM H. D. HICKMAN (ERDA) TO J. H. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HOPPE, W. C.
COMMENT: (ALSO H-91)
- H-220 AUTHOR: HICKMAN, H. D. DATE: 1975-04-04
TITLE: REMOVAL OF MERCURY FROM PROCESS EQUIPMENT IN BUILDING 9201-4, LETTER FROM H. D. HICKMAN (ERDA)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HOPPE, W. C.
COMMENT: APPROVAL FROM ERDA HEADQUARTERS TO REMOVE, BOTTLE, AND STORE MERCURY FROM ALPHA-4. (ALSO H-389, -393)
- H-220 AUTHOR: SMITH, D. W. DATE: 1975-05-22
TITLE: MERCURY BOTTLING COSTS, LETTER FROM D. W. SMITH TO J. S. MURRAY
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HOPPE, W. C.
COMMENT: MERCURY BOTTLING AND BUILDING DECONTAMINATION COSTS FOR ALPHA-4 IN PY 1976

- 4-220 AUTHOR: CASE, J. M. DATE: 1975-05-23
TITLE: REMOVAL OF MERCURY FROM PROCESS EQUIPMENT, BUILDING 9201-4, LETTER FROM J. M. CASE (UCC) TO H. D. HICKMAN (ERDA)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HOPPE, W. C.
COMMENT: CC ST, SCHEDULE, AND DESCRIPTION OF BOTTLING MERCURY IN ALPHA-4
- 4-220 AUTHOR: HICKMAN, H. D. DATE: 1975-09-11
TITLE: EXCESSING OF MERCURY FOR DISPOSAL BY GSA. LETTER FROM H. D. HICKMAN (ERDA) TO J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HOPPE, W. C.
COMMENT: REQUEST FOR COST ESTIMATES ON PURCHASING, FILLING, AND TESTING MERCURY PLASKS. (ALSO M-393, -760)
- 4-220 AUTHOR: MARTIN, J. R. DATE: 1975-09-24
TITLE: STRIPPING AND BOTTLING MERCURY IN ALPHA-4. BETWEEN D. P. HARRILL (ERDA), D. W. SMITH (UCC), AND J. MCGRAY (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HOPPE, W. C.
COMMENT: MEMO OF PHONE CONVERSATION
- 4-220 AUTHOR: HAFT, R. J. DATE: 1975-09-29
TITLE: DRAFT OF REQUEST FOR FUNDS TO REMOVE MERCURY FROM PROCESS EQUIPMENT IN BUILDING 9201-4, FROM R. J. HAFT (ERDA) TO M. C. GREEN (GSA)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HOPPE, W. C.
COMMENT: UNSIGNED, PRELIMINARY DRAFT OF FUNDING REQUEST
- 4-220 AUTHOR: HICKMAN, J. M. DATE: 1975-10-02
TITLE: REPLASKING OF GSA-OWNED MERCURY - 2276 PLASKS, LETTER FROM H. D. HICKMAN (ERDA) TO J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HOPPE, W. C.
COMMENT: GSA CONCURRENCE WITH UCC TESTING AND HANDLING PROPOSAL FOR MERCURY PLASKS AND GSA ALLOCATION OF FUNDS
- 4-220 AUTHOR: HAFT, R. J. DATE: 1975-10-07
TITLE: REQUEST FOR FUNDS TO REMOVE MERCURY FROM PROCESS EQUIPMENT IN ALPHA-4, LETTER FROM R. J. HAFT (ERDA) TO M. C. GREER (ERDA)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HOPPE, W. C.
COMMENT: REQUEST TO ERDA CONTROLLER FOR MERCURY REMOVAL FUNDS

H-220 AUTHOR: CASE, J. M. DATE: 1975-10-13
TITLE: COST ESTIMATES FOR BOTTLING MERCURY, LETTER FROM J. M. CASE (UCC) TO H. D. HICKMAN (ERDA)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT:

H-221 AUTHOR: HICKMAN, H. D. DATE: 1975-10-21
TITLE: SSA/ERDA MEMO OF AGREEMENT ON MERCURY STORAGE AND HANDLING, LETTER FROM H. D. HICKMAN (ERDA) TO J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: COST REIMBURSEMENT RATES FOR MERCURY

H-220 AUTHOR: MICHENET, L. R. DATE: 1975-11-05
TITLE: CLASSIFICATION OF MERCURY, LETTER FROM L. R. MICHENET (ERDA) TO T. W. WHITE (ERDA)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: CLASSIFICATION CP INVENTORY. (ALSC N-393)

H-220 AUTHOR: ERDA DATE: 1976-03-15
TITLE: ERDA REPORT OF EXCESS PERSONAL PROPERTY (MERCURY) TO GSA
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT:

H-220 AUTHOR: WALDROP, P. P. DATE: 1976-04-22
TITLE: PROCUREMENT OF MERCURY STORAGE FLASKS, LETTER FROM P. WALDROP TO A. L. FISCHER
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT:

H-220 AUTHOR: HIBBS, F. F. DATE: 1976-07-28
TITLE: PLASKING MERCURY, LETTER FROM F. HIBBS (UCC) TO R. J. HART (ERDA)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: INFO ON MERCURY PLASKING IN ALPHA-4. (ALSO N-393, -796)

Y-220 AUTHOR: TYL, E. DATE: 1976-09-30 - 1977-09-30
TITLE: STATUS OF MERCURY INVENTORY
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: HOPPE /
COMMENT: HANDWRITTEN SUMMARY VERIFIED BY TYL.

Y-220 AUTHOR: ERDA DATE: 1977-03-14
TITLE: ERDA RECEIVING REPORTS FOR MERCURY FBCM GSA
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT:

Y-220 AUTHOR: ERDA DATE: 1977-05-12
TITLE: SHIPPING ORDER FOR MERCURY FROM DOE TO SAVANNAH RIVER PLANT
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT:

Y-220 AUTHOR: DURONT COMPANY DATE: 1977-05-12
TITLE: SHIPPING ORDER FOR MERCURY FROM DOE TO SAVANNAH RIVER PLANT
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT:

Y-220 AUTHOR: ERDA DATE: 1977-05-17
TITLE: ERDA PROPERTY DISPOSITION INSTRUCTIONS/TRANSFER REQUEST FOR MERCURY TO SAVANNAH RIVER PLANT. (NO. 77-9)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT:

Y-220 AUTHOR: BUTLER, R. A. DATE: 1977-09-30
TITLE: INCREMENTAL QUANTITIES OF MERCURY AT Y-12 OVER QUANTITIES ON Y-12 LEDGER. LETTER FROM R. A. BUTLER (ERDA) TO FILE
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: INCREMENTAL MERCURY QUANTITIES IN DOLLARS

H-220 AUTHOR: EBERT, T. H. DATE: 1977-10-03
TITLE: MERCURY PLASKING, LETTER FROM T. H. EBERT TO W. C. HOPPE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: MERCURY AMOUNTS (FLASKS AND POUNDS) FROM ALPHA-5

Y-220 AUTHOR: HICKMAN, H. D. DATE: 1978-03-10
TITLE: EXCESSING OF MERCURY FOR DISPOSAL BY GSA, LETTER FROM H. D. HICKMAN (DOE) TO J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: GSA REQUEST FOR TRANSFER OF MERCURY FLASKS

H-220 AUTHOR: HIBBS, R. P. DATE: 1978-05-17
TITLE: RECOMMENDATIONS FOR PROJECTED USES OF Y-12 ALPHA-4, LETTER FROM R. P. HIBBS (UCC) TO R. J. HART (DUKE)
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: EQUIPMENT DISPOSAL AND POTENTIAL USES OF ALPHA-4

H-220 AUTHOR: H. REYNOLDS DATE: 1978-07-17
TITLE: SALE OF SCRAP MERCURY FLASKS, LETTER FROM H. REYNOLDS TO D. R. McCANNON
SUBJECT: CORRESPONDENCE, INTERNAL (LSO M-393)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: REQUEST FOR SALE OF SCRAP MERCURY FLASKS (INCLUDES WEIGHT)

H-220 AUTHOR: ALPHA-4 MERCURY PLASKING DATE: 1978-07-17
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: TABLE (HAND WRITTEN, TWO-PAGE) WITH MERCURY AMOUNTS IN POUNDS AND FLASKS

Y-220 AUTHOR: EBERT, T. H. DATE: 1978-07-18
TITLE: ALPHA-4 MERCURY PLASKING, LETTER FROM T. H. EBERT TO M. B. BRADSHAW
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: MERCURY AMOUNTS (FLASKS AND POUNDS) FROM ALPHA-4

- M-220 AUTHOR: BRADSHAW, M. R. DATE: 1978-08-18
TITLE: MERCURY ADJUSTMENT. LETTER FROM M. R. BRADSHAW TO W. T. CARTER (K-25)
SUBJECT: CORRESPONDENCE-INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HOPPE, W. C.
COMMENT: BUDGET ADJUSTMENT FOR MERCURY BECAUSE OF STRIPPING ALPHA-4 (WITH TABLE IN DOLLARS AND POUNDS)
- Y-220 AUTHOR: BUTLFR, S. A. DATE: 1978-08-29
TITLE: ADDITIONAL MERCURY QUANTITIES AT Y-12, LETTER FROM R. A. BUTLER (DOE) TO BUDGET DIVISION (UCC)
SUBJECT: CORRESPONDENCE-EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HOPPE, W. C.
COMMENT: INVENTORY CHANGE FUNDS AT Y-12 STORES
- M-220 AUTHOR: BRADSHAW, M. R. DATE: 1978-09-22
TITLE: MERCURY INVENTORY ADJUSTMENT. LETTER FROM M. R. BRADSHAW TO W. T. CARTER
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HOPPE, W. C.
COMMENT: ATTACHMENT SHOWING CURRENT INVENTORY (FLASKS, LBS., DOLLARS)
- M-220 AUTHOR: HICKMAN, H. D. DATE: 1979-04-12
TITLE: DO-OWNED MERCURY FOR SALE BY GSA, LETTER FROM H. D. HICKMAN (DOE) TO J. H. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL (ALSO M-393, M-760)
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HOPPE, W. C.
COMMENT: GSA REQUEST FOR IN-PLACE TRANSFER OF ADDITIONAL 12,000 FLASKS OF EXCESS MERCURY AND DOE REQUEST FOR COST ESTIMATE
- M-220 AUTHOR: CASE, J. H. DATE: 1979-04-25
TITLE: MERCURY RE-FLASKING COST ESTIMATE, LETTER FROM J. H. CASE (UCC) TO H. D. HICKMAN. (DOE)
SUBJECT: CORRESPONDENCE, EXTERNAL (ALSO M-393)
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HOPPE, W. C.
COMMENT: PRELIMINARY COST ESTIMATE FOR REPLASKING 10,000 LEAKING MERCURY FLASKS OF GSA IN UTAH
- M-220 AUTHOR: PERRYMAN, G. I. DATE: 1979-10-18
TITLE: COMPLIANCE WITH THE STRATEGIC AND CRITICAL MATERIALS STOCKPILING ACT, LETTER FROM G. I. PERRYMAN (GSA) TO M. EIDENOUR (DOE)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HOPPE, W. C.
COMMENT: CHANGES DESIGNATION OF STOCKPILE MERCURY FROM USS TO NDS

M-220 AUTHOR: HICKMAN, H. D. DATE: 1980-01-31
TITLE: DO E-OWNED MERCURY FOR SALE BY GSA, LETTER FROM H. D. HICKMAN (DOE) TO J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL (ALSO M-303, M-422)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: INFO ON GSA REQUEST FOR IN-PLACE TRANSFER OF ADDITIONAL 45,000 PLASKS OF EXCESS MERCURY

M-220 AUTHOR: CASE, J. M. DATE: 1980-02-25
TITLE: DO E-OWNED MERCURY FOR SALE BY GSA, LETTER FROM J. M. CASE (UCC) TO H. D. HICKMAN (DOE)
SUBJECT: CORRESPONDENCE, EXTERNAL (ALSO M-220, M-341)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: INFO ON 45,000 PLASKS OF EXCESS MERCURY TO BE TRANSFERRED TO GSA

M-220 AUTHOR: OSTER, H. S. DATE: 1980-07-23
TITLE: ACCOUNTING FOR THE SALE OF EXCESS MERCURY BY GSA, LETTER FROM H. S. OSTER (DOE) TO G. A. RISEB (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: CHANGE IN ACCOUNTING FOR MERCURY REVENUE FROM SALE BY GSA (INCLUDES INSTRUCTIONS ON ACCOUNTING FOR FUTURE MERCURY SHIPMENT)
S PROM Y-12)

M-220 AUTHOR: AMENDMENT 13 TO AGREEMENT NO. GS-00P-23195(SCB) BETWEEN GSA AND DOE DATE: 1981-03-16
TITLE: MERCURY INVENTORY ADJUSTMENT, LETTER FROM H. D. HICKMAN (DOE) TO J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL (ALSO M-369, M-760)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: INCREASE IN RECORDED VALUE (IN DOLLARS) OF EXCESS MERCURY AT Y-12

M-220 AUTHOR: GSA DATE: 1981-10-26
TITLE: STOCKPILE INFORMATION NOTICE FROM GSA ON SALE OF MERCURY PLASKS
SUBJECT: CORRESPONDENCE-EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: NOTICE OF SALE OF 150' MERCURY PLASKS BY GSA TO 2 BIDDERS

- Y-220 AUTHOR: WILLIAMS, R. P. DATE: 1983-02-26
TITLE: 1983 Y-12 MERCURY CLEANUP, MEMO FROM R. P. WILLIAMS TO W. C. HOPPE
SUBJECT: CORRESPONDENCE-INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: ATTACHMENT: PROPOSED BUDGET ESTIMATE FOR 1983 Y-12 PLANT MERCURY CLEANUP
- Y-220 AUTHOR: YAGGI, W. J. DATE: 1983-03-04
TITLE: 1983 Y-12 MERCURY CLEANUP, LTR. PRCM b. J. YAGGI TO DISTRIBUTION
SUBJECT: CORRESPONDENCE-INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: 1983 Y-12 MERCURY CLEANUP ACTION PLAN AND BUDGET ESTIMATE
- Y-221 AUTHOR: FEE, G. G. DATE: 1983-04-11
TITLE: STRIPPING OF BUILDING 9201-4 AND CLEANUP ACTIVITIES, LETTER FROM G. G. FEE (UCC) TO H. D. HICKMAN (DOE)
SUBJECT: CORRESPONDENCE-EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: ATTACHMENT: APPROACH TO STRIPPING 9201-4 (OBJECTIVES AND PLAN)
- Y-222 AUTHOR: DATE: 1955-1964
TITLE: SOLVENT COSTS
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: C DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: COMILATION OF TRANSFER VOUCHERS, INVENTORIES, AND RECONCILIATION OF CAPITAL MERCURY
- Y-223 AUTHOR: DATE:
TITLE: ACCOUNTABILITY OF EXCESS MERCURY, FROM ACCOUNTING MANUAL 2A.28
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: DRAFT - PROCEDURE
- Y-223 AUTHOR: KELLER, C. A. DATE: 1960-03-04
TITLE: LOAD OF MERCURY TO NATIONAL BUREAU OF STANDARDS, LETTER FROM CHARLES A. KELLER (AEC) TO J. P. MURRAY (UCC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: C DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: LOAN OF MERCURY FOR USE IN ICW LEVEL COUNTING PROJECT

4-223 AUTHOR: SAPIRIE, S. R. DATE: 1962-10-17
TITLE: EXCESS MERCURY, LETTER FROM S. R. SAPIRIE TO C. E. LARSON
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: RECLASSIFICATION REQUIREMENTS FOR EXCESS MATERIAL

4-223 AUTHOR: KELLER, C. A. DATE: 1962-11-01
TITLE: EXCESS MERCURY, LETTER FROM C. A. KELLER (AEC) TO R. P. HIBBS (UCC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: P.C. S-108661-63 AUTHORIZING TRANSFER OF MERCURY ON LOAN BASIS TO NATIONAL BUREAU OF STANDARDS
4-223 AUTHOR: CENTER, CLARK E. DATE: 1962-11-26
TITLE: EXCESS MERCURY, LETTER FROM CLARK E. CENTER (UCC) TO S. R. SAPIRIE (AEC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: SPECTROGRAPHIC ANALYSIS OF IMPURITIES

4-223 AUTHOR: DATE: 1962-1968
TITLE: CORRESPONDENCE COMPILED ON MERCURY-RELATED SUBJECTS, RECEIVING REPORTS, SHIPPING ORDERS AND P.C.'S
SUBJECT:
REPORT NUM: CLASS: S DRAWER: 5
CUSTODIAN: ACCOUNTING AND BUDGET DATA
COMMENT: 1966 MERCURY LOSS, ALPHA-4 INV., BLDG 9201-4 (GOLDENSON MEMO OF MAR 68) EXCESS MERCURY, REPLASKING OPER., MERCURY AUDIT
4-223 AUTHOR: DATE: 1963-03-29
TITLE: DEFENSE MATERIALS SYSTEM - GSA, LETTER FROM C. A. KELLER (AEC) TO R. P. HIBBS (UCC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: PROCEDURES PERTINENT TO STORAGE OF MERCURY

4-223 AUTHOR: DATE: 1963-12-12
TITLE: MERCURY - ACCOUNTING, LETTER FROM S. R. SAPIRIE (AEC) TO C. E. LARSON (UCC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: ACCOUNTING TREATMENT FOR MERCURY INVENTORIES

- Y-223 AUTHOR: CHRISTIE, F. O. DATE: 1965-04-13
TITLE: AUDIT REPORT ON PHYSICAL AND ACCOUNTING CONTROLS OVER MERCURY AT Y-12 FROM P. O. CHRISTIE TO W. J. HENDERSON
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: SUMMARY OF FINDINGS
- Y-223 AUTHOR: SMITH, D. W. DATE: 1965-04-20
TITLE: MERCURY AUDIT COMMENTS
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: COMMENTS ON AEC AUDITOR'S REPORT "PHYSICAL AND ACCOUNTING CONTROL OVER MERCURY AT Y-12" DATED APRIL 13, 1965
- Y-223 AUTHOR: KURTZ, J. J. DATE: 1965-05-05
TITLE: MERCURY BOTTLING AND ACCOUNTABILITY PROCEDURE ARC MELTING DEPARTMENT
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: BOTTLING PROCESS - DETAILED PROCEDURES
- Y-223 AUTHOR: HIBBS, R. P. DATE: 1965-05-07
TITLE: BUILDING 9201-4 MERCURY AREA PATROL AND INSPECTION PROCEDURE
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: SYSTEMATIC PLAN PCR PATROLLING THE BUILDING 9201-4 AND MERCURY STORAGE AREA
- Y-223 AUTHOR: KELLER, C. A. DATE: 1965-05-07
TITLE: MERCURY HANDLING AT Y12, LETTER FROM R. P. HIBBS (UCC) TO C. A. KELLER (AEC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: C DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: PROCEDURES
- Y-223 AUTHOR: KELLER, C. A. DATE: 1965-05-25
TITLE: DISPOSAL OF MERCURY, LETTER FROM C. A. KELLER (AEC) TO R. P. HIBBS (UCC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: STORAGE AND RELATED COSTS. TRANSFER AND RELATED ACTIVITIES.

(X) = located in Files by SmF

Missing M File No's from Print Out

To Do
Reviewing printout

(20)	(309)	412	(722)
(21)	(313)	413	749
(22)	(314)	414	(756)
(42)	(317)	419	758
52	(318)	(429)	782
(119)	(319)	(446)	792
(156)	(320)	(447)	828
219	(322)	(448)	833
(221)	(324)	(461)	840 - 840
(224)	329	(466)	841-842
(245)	330	(489)	(843-846)
255	(336) 337	(512)	847
256	(358) 338 339	(514-523)	(848-849)
257	359	(525)	850
262	362	(526)	(851-853)
263	364	(527)	45 + 83
267	365	(528)	
268	366	(546)	
273	(371)	(551)	
274	(373)	(586)	
(286)	383	(590)	
(287)	(397)	(593-598)	132 92 140
(288)	402	600	
(289)	404	(608)	
(291-305)	408	(652)	
(308)	(411)	(668)	

missing from print out
132
1853
found during search
92

Y-223 AUTHOR: HIBBS, R. F. DATE: 1965-06-01
TITLE: DISPOSAL OF MERCURY. LETTER FROM R. F. HIBBS (UCC) TO C. A. KELLER (AEC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: EXCESS MERCURY, GSA TRANSFER. STORAGE COSTS. REFLASKING.

Y-223 AUTHOR: KELLER, C. A. DATE: 1965-06-16
TITLE: MERCURY HANDLING AT THE Y12 PLANT. LETTER FROM C. A. KELLER (AEC) TO R. F. HIBBS (UCC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: PROCEDURES

Y-223 AUTHOR: KELLER, C. A. DATE: 1965-10-22
TITLE: EXCESS MERCURY. GSA TRANSFER. LETTER FROM C. A. KELLER TO R. F. HIBBS
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: TRANSFER FOR GSA DISPOSAL

Y-223 AUTHOR: SAPIRE, S. R. DATE: 1966-03-30
TITLE: COMMITTEE TO INVESTIGATE APPARENT LOSS OF MERCURY AT Y12 - MARCH 28, 1966. LETTER FROM S. R. SAPIRE TO W. B. KENYA ET AL.
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: ASSIGNMENTS TO COMMITTEE.

Y-223 AUTHOR: SAPIRE, S. R. DATE: 1966-03-30
TITLE: MERCURY SPILL MARCH 28, 1966, BLDG 9201-5
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: PRELIMINARY CLEANUP RECOVERY. INVENTORIES. DETAILED ACCOUNT IN DRAFT FORM.

Y-223 AUTHOR: KELLER, C. A. DATE: 1966-05-06
TITLE: STORAGE OF GSA MERCURY. LETTER FROM C. A. KELLER TO R. F. HIBBS
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: TRANSFER BEING HELD IN ABEYANCE.

4-223 AUTHOR: SAPIRIE, S. P. DATE: 1966-05-13
TITLE: REPORT OF INVESTIGATING COMMITTEE - LCSS OF MERCURY AT Y-12, LETTER FROM S. R. SAPIRIE (AEC) TO C. E. LARSON (UCC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: RECOMMENDATIONS OF COMMITTEE

4-223 AUTHOR: KELLER, C. A. DATE: 1966-06-22
TITLE: ACCIDENTAL LOSS OF MERCURY AT Y-12, LETTER FROM S. R. SAPIRIE TO C. E. LARSON
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: WRITE-OFF PRIOR TO JUNE 30, 1966 ACTIVITY 46-03-03 "EXTRAORDINARY LOSSES".

4-223 AUTHOR: KELLER, C. A. DATE: 1966-06-27
TITLE: STORAGE OF GSA MERCURY GS-00P-23195 (SCM), LETTER FROM C. A. KELLER (AEC) TO R. P. HIBBS (UCC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: BILLINGS. AGREEMENT FOR PERIOD ENDING JUNE 30, 1967.

4-223 AUTHOR: HOLLINGSWORTH, R. E. DATE: 1966-07-05
TITLE: LOSS OF MERCURY AT Y-12 PLANT, LETTER FROM R. E. HOLLINGSWORTH (AEC) TO S. R. SAPIRIE (AEC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: SEQUENCE OF OPERATING ERRORS. CONCERN EXPRESSED.

4-223 AUTHOR: KELLER, C. A. DATE: 1966-07-19
TITLE: LOSS OF MERCURY AT Y-12, LETTER FROM C. E. LARSON (UCC) TO S. R. SAPIRIE (AEC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPCPT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: COMMITTEE ESTABLISHED FOR FORMAL INVESTIGATION. RECOMMENDATIONS OF COMMITTEE.

4-223 AUTHOR: KELLER, C. A. DATE: 1967-06-22
TITLE: STORAGE OF GSA MERCURY, LETTER FROM C. A. KELLER (AEC) TO R. P. HIBBS (UCC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: GS-00P-23195 EXTENSION TO JUNE 30, 1968

- 4-223 AUTHOR: KELLER, C. A. DATE: 1968-01-17
TITLE: EXCESS MERCURY, GSA TRANSFER, LETTER FROM C. A. KELLER (AEC) TO J. H. CASE (UCC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: EXCESS MERCURY. FLASKING OPERATIONS.
- 4-223 AUTHOR: CASE, J. M. DATE: 1968-02-09
TITLE: FLASKING MERCURY, LETTER FROM J. H. CASE (UCC) TO C. A. KELLER (AEC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: FLASKING. INVENTORY LEVELS. ALPHA-4. BOTTLING.
- 4-223 AUTHOR: GOLDENSON, A. P. DATE: 1968-03-04
TITLE: BUILDING 9201-4 MERCURY, LETTER FROM A. P. GOLDENSON TO W. T. CHOW
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: S DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: SHORTAGE. INVENTORY MEASUREMENT METHODS. UNCERTAINTY PROPAGATION.
- 4-223 AUTHOR: KELLER, C. A. DATE: 1968-03-05
TITLE: FLASKING OF GSA MERCURY STILL IN PROCESS SYSTEM, LETTER FROM C. A. KELLER (AEC) TO J. H. CASE (UCC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: FLASKING OPERATIONS
- 4-223 AUTHOR: GRITZNER, V. B. DATE: 1968-03-06
TITLE: ALPHA-4 MERCURY INVENTORY, LETTER FROM V. B. GRITZNER TO R. D. WILLIAMS
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: S DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: PHYSICAL INVENTORY BLDG 9201-4.
- 4-223 AUTHOR: KELLER, CHARLES A. DATE: 1968-06-24
TITLE: GSA MERCURY STORAGE, LETTER FROM C. A. KELLER (AEC) TO J. H. CASE (UCC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: BILLINGS, MEMO OF AGREEMENT GS-00P-23195 (SCM) ENDING JUNE 30, 1968

- 4-223 AUTHOR: CASE, J. M. DATE: 1968-06-28
TITLE: MERCURY INVENTORY LOSS. LETTER FROM J. M. CASE (UCC) TO C. A. KELLER (AEC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: S DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: PHYSICAL COUNTS VS RECORDS. WRITE-OFF.
- 4-223 AUTHOR: CASE, J. M. DATE: 1968-07-16
TITLE: MERCURY CONTRACT GS-00-DF-(S)-80041. LETTER FROM J. M. CASE (UCC) TO C. A. KELLER (AEC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: J. T. CONSIGLIO MEMO. JUNE 19, 1968. RESIDUE IN MERCURY
- 4-223 AUTHOR: KELLER, CHARLES A. DATE: 1968-08-22
TITLE: MERCURY INVENTORY LOSS. LETTER FROM CHARLES A. KELLER (AEC) TO J. M. CASE (UCC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: S DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: CASE LETTER OF JUNE 28, 1968. WRITE-OFF RECORDED IN JUNE 1968
- 4-223 AUTHOR: CASE, J. M. DATE: 1968-09-26
TITLE: MERCURY INVENTORY LOSS. LETTER FROM J. M. CASE (UCC) TO C. A. KELLER (UCC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: S DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: PHYSICAL INVENTORY OF BLDG 9201-4
- 4-223 AUTHOR: KELLER, C. A. DATE: 1968-11-14
TITLE: MERCURY INVENTORY LOSS. LETTER FROM C. A. KELLER (AEC) TO J. M. CASE (UCC)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: S DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: PHYSICAL INVENTORY COUNT VS RECORDS. ADDITIONAL WRITE-OFF. PHYSICAL INVENTORY ADJUSTMENTS.
- 4-223 AUTHOR: DATE: 1971
TITLE: ACCOUNTING RECORDS OF MERCURY-RELATED ACTIVITIES
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: C DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: COMILATION OF DATA OF MERCURY-SLUDGE IN 1971. AEC EXCESS, WRITE-OFFS & LOSSES, BOTTLING DATA, HEC. DATA, TRANSFERS.

Y-225 AUTHOR: EBERT, T. H. ET AL. DATE: 1976 - 1978
TITLE: OPERATING INSTRUCTIONS - MERCURY FLASKING SAFETY ANALYSIS REPORT ON MERCURY FLASKING
SUBJECT: MERCURY FLASK DATA
REPORT NUM: CLASS: C DRAWER: 8
CUSTODIAN: EBERT, T. H.
COMMENT:

Y-225 AUTHOR: EBERT, T. H. ET AL. DATE: 1976 - 1978
TITLE: OPERATING INSTRUCTIONS - MERCURY FLASKING SAFETY ANALYSIS REPORT ON MERCURY FLASKING
SUBJECT: MERCURY FLASK DATA
REPORT NUM: CLASS: C DRAWER: 15) /
CUSTODIAN: EBERT, T. H.
COMMENT:

Y-226 AUTHOR: DATE: 1967-11 1968-01
TITLE: Y-12 TECHNICAL PROGRESS REPORT PART E - CHEMISTRY NOV. 1967 - JAN. 1968
SUBJECT: QUARTERLY TECHNICAL PROGRESS REPORT, Y-12 PLANT
REPORT NUM: Y-1529-E CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-227 AUTHOR: DATE: 1968-02 1968-04
TITLE: Y-12 TECHNICAL PROGRESS REPORT PART E - CHEMISTRY FEB - APRIL 1968
SUBJECT: QUARTERLY TECHNICAL PROGRESS REPORT, Y-12 PLANT
REPORT NUM: Y-1530-E CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-228 AUTHOR: DILL, M. S. DATE: 1967-03
TITLE: DETERMINATION OF SUBMICROGRAM QUANTITIES OF MERCURY IN WATER AND LITHIUM HYDROXIDE SOLUTIONS
SUBJECT: TECHNICAL REPORT
REPORT NUM: Y-1572 CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-229 AUTHOR: DATE: 1968-05 1968-07
TITLE: Y-12 TECHNICAL PROGRESS REPORT PART E - CHEMISTRY MAY - JUNE 1968
SUBJECT: QUARTERLY TECHNICAL PROGRESS REPORT, Y-12 PLANT
REPORT NUM: Y-1641-E CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

M-230 AUTHOR: DATE: 1975-06
TITLE: Y-12 DEVELOPMENT DIVISION TECHNICAL PROGRESS REPORT PART 3 - METAL PROCESSING - JUNE 1, 1975
SUBJECT: QUARTERLY TECHNICAL PROGRESS REPORT, Y-12 PLANT
REPORT NUM: Y-1908-3 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-231 AUTHOR: DATE: 1971-05 1971-07
TITLE: Y-12 DEVELOPMENT DIVISION - TECHNICAL PROGRESS REPORT PART D - LABORATORY MAY - JULY 1971
SUBJECT: QUARTERLY TECHNICAL PROGRESS REPORT, Y-12 PLANT
REPORT NUM: Y-1773-D CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

M-232 AUTHOR: DATE: 1977-04 1977-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL - JUNE 1977
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2036 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-233 AUTHOR: DATE: 1972-10 1972-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCTOBER-DECEMBER, 1972
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1768 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-234 AUTHOR: PENNINGTON, J. W. DATE: 1959
TITLE: MERCURY - A MATERIALS SURVEY
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: CP
COMMENT: PROPERTIES, USES AND SUBSTITUTES (ALSO M-749)

M-235 AUTHOR: DATE: 1972-04 1972-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1972
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1766 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-236 AUTHOR: DATE: 1972-01 1972-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JANUARY-MARCH, 1972
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1765 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-237 AUTHOR: DATE: 1971-10 1971-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCTOBER-DECEMBER, 1971
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1764 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-238 AUTHOR: DATE: 1971-07 1971-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPTEMBER, 1971
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1763 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-239 AUTHOR: DIETRICH, W. C. DATE: 1965-04
TITLE: DETERMINATION OF SUBMICROGRAM QUANTITIES OF MERCURY IN LITHIUM METAL, ITS HYDRIDE, OR HYDROXIDE
SUBJECT: TECHNICAL REPORT
REPORT NUM: Y-1482 CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-240 AUTHOR: SMITHWICK, R. W. DATE: 1981-05
TITLE: COMPRESSION EQUATIONS FOR MERCURY POROSIMETRY
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y/DK-274 CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-241 AUTHOR: SMITHWICK, R. W. DATE: 1982-08
TITLE: A GENERALIZED ANALYSIS FOR MERCURY POROSIMETRY
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y/DK-294 CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT:

M-242 AUTHOR: SMITHWICK, R. W. DATE: 1982-05
TITLE: COMPRESSION EQUATIONS FOR MERCURY POROSIMETRY
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y/OK-306 CLASS: U DRAWER: 10
CUSTODIAN: CF
COMMENT:

M-243 AUTHOR: LAFRANCE, L. J. DATE: 1957-05
TITLE: PRELIMINARY REPORT ON PERSONNEL EXPOSURE TO MERCURY IN THE COLEX PLANTS
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-D1-1 CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT:

M-244 AUTHOR: REPORT ON PERSONNEL EXPOSURE TO MERCURY IN THE COLEX PLANT
DATE: 1957-05-28
SUBJECT: TECHNICAL REPORTS
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT:

M-244 AUTHOR: MONTHLY MERCURY INVENTORY REPORTS DATE: 1975 - 1977
SUBJECT: MERCURY FLASK DATA
REPORT NUM: CLASS: C DRAWER: 8
CUSTODIAN: TRAFFIC
COMMENT:

M-246 AUTHOR: OPERATIONS FOREMAN DATE: 1961
TITLE: FEED PEEP AND EXTRACT DAILY LOGBOOK FCR 1961 COMPLETE
SUBJECT: PRODUCTION OPERATING RECORDS
REPORT NUM: CLASS: U DRAWER: 12
CUSTODIAN:
COMMENT:

M-247 AUTHOR: DOW, NEAL DATE: 1956-04 1956-07
TITLE: DECOMPOSER LOGBOOK FOR ALPHA-4 CASCADE - APR 56 THRU JULY 56
SUBJECT: PRODUCTION OPERATING RECORDS
REPORT NUM: CLASS: U DRAWER: 12
CUSTODIAN:
COMMENT:

N-248 AUTHOR: FOREMAN DATE: 1955-06 1957-03
TITLE: INSTRUCTIONS LOGBOOK FOR ALPHA-4 CASCADES, JUN 55 TO MAR 57
SUBJECT: PRODUCTION OPERATING RECORDS
REPORT NUM: CLASS: U DRAWER: 12
CUSTODIAN:
COMMENT:

N-249 AUTHOR: SHIFT FOREMAN DATE: 1957-03 1958-12
TITLE: INSTRUCTIONS LOGBOOK ALPHA-4 CASCADES MAR 1957 TO DEC 1958
SUBJECT: PRODUCTION OPERATING RECORDS
REPORT NUM: CLASS: U DRAWER: 12
CUSTODIAN:
COMMENT:

N-250 AUTHOR: SHIFT FOREMAN DATE: 1958-12 1962-12
TITLE: INSTRUCTIONS LOGBOOK FOR ALPHA-4 CASCADES, DEC 1958 TO DEC 1962
SUBJECT: PRODUCTION OPERATING RECORDS
REPORT NUM: CLASS: U DRAWER: 12
CUSTODIAN:
COMMENT:

N-251 AUTHOR: SHIFT FOREMAN DATE: 1962-12 1963-06
TITLE: LOGBOOK OF POWER USE - ALPHA-5 MARBLE PRODUCTION DEC 1962 TO JUN 1963
SUBJECT: PRODUCTION OPERATING RECORDS
REPORT NUM: CLASS: U DRAWER: 12
CUSTODIAN:
COMMENT:

N-252 AUTHOR: SHIFT FOREMAN DATE: 1962-12 1963-06
TITLE: INSTRUCTIONS LOGBOOK, ALPHA-4 CASCADES DEC 1962 TO JUN 1963
SUBJECT: PRODUCTION OPERATING RECORDS
REPORT NUM: CLASS: U DRAWER: 12
CUSTODIAN:
COMMENT:

N-253 AUTHOR: SHIFT FOREMAN DATE: 1962-12 1963-05
TITLE: FOREMAN'S LOGBOOK, MARBLE CASCADE DEC 62 TO MAY 63
SUBJECT: PROD. OPER. RECORDS - LOGBOOK
REPORT NUM: CLASS: U DRAWER: 12
CUSTODIAN:
COMMENT:

M-251 AUTHOR: SHIFT FOREMAN DATE: 1962-12 1963-06
TITLE: SHIFT LOGBOOK. MARBLE CASCADE DEC 1962 TO JUN 1963
SUBJECT: PHOT. OPER. REC. - LOGBOOK
REPORT NUM: CLASS: U DRAWER: 12
CUSTODIAN:
COMMENT:

M-252 AUTHOR: SHIFT FOREMAN DATE: 1957-12 1958-08
TITLE: INSTRUCTION LCGBOOK FOR AUXILIARIES OPERATION DEC 57 TO AUG 58
SUBJECT: PRODUCTION OPERATION RECORDS - LOGBOOK
REPORT NUM: CLASS: U DRAWER: 12
CUSTODIAN:
COMMENT:

M-253 AUTHOR: ALPHA 4 MERCURY AND ALLOY LOSSES. DATE: 1958-05 1961-03
TITLE: ALPHA 4 MERCURY AND ALLOY LOSSES. LOGBOOK MAY 1958 TO MAR 1961
SUBJECT: PROD. OPER. RECORDS - LOGBOOK
REPORT NUM: CLASS: U DRAWER: 12
CUSTODIAN:
COMMENT:

M-254 AUTHOR: SUMP LOSSES OF SOME SALTS AND MERCURY-ALPHA 4 AND ALPHA 5 APRIL, 1961 TO NOV, 1961
TITLE: SUMP LOSSES OF SOME SALTS AND MERCURY-ALPHA 4 AND ALPHA 5 APRIL, 1961 TO NOV, 1961
SUBJECT: PRODUCTION OPERATION RECORDS - LOGBOOK
REPORT NUM: CLASS: U DRAWER: 12
CUSTODIAN:
COMMENT:

M-255 AUTHOR: DATE: 1962-05 1961-11
TITLE: SUMP LOSSES OF SLATS, WATER, AND MERCURY - ALPHA-4 AND ALPHA-5 JAN, 1962 - MAY, 1963
SUBJECT: PRODUCTION OPERATION RECORDS - LOGBOOK
REPORT NUM: CLASS: U DRAWER: 12
CUSTODIAN:
COMMENT:

M-258 AUTHOR: RADIATION SAFETY DEPT DATE: 1958-12-31
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 290-IH-4 CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT: SOLVENT XRF ANALYSIS AND BERYLLIUM CARDS; NOVEMBER 2, 1954, TO DECEMBER 31, 1958.

- 1-259 AUTHOR: RADIATION SFTY DEPT DATE: 1958-12-31
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 2090-IH-4 CLASS: U DRAWER: 13
CUSTODIAN: FC
COMMENT: DAILY SOLVENT AIR ANALYSIS, JANUARY 17, 1956 - DECEMBER 31, 1958, OCTOBER 4, 1955 - JULY 1, 1956, BLDGS 9201-4, 9204-4.
- 1-261 AUTHOR: RADIATION SFTY DEPT DATE: 1958-12-31
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 2090-IH-4 CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT: SOLVENT AIR ANALYSIS, JANUARY, 1958 - DECEMBER, 1958, 9201-4, 9201-5.
- 1-261 AUTHOR: RADIATION SFTY DEPT DATE: 1958-12-31
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 2090-IH-4 CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT: SOLVENT AIR ANALYSIS, JANUARY, 1958 - DECEMBER, 1958, 9201-4, 9201-5.
- 1-264 AUTHOR: OPERATIONS FOREMAN DATE: 1960
TITLE: FEED PREP AND EXTRACT DAILY LOGBOOK - FOR EACH DAY OF 1960
SUBJECT: PRODUCTION OPERATING RECORDS
REPORT NUM: CLASS: U DRAWER: 12
CUSTODIAN:
COMMENT:
- 1-265 AUTHOR: RADIATION SFTY DEPT DATE: 1957-12-31
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 2090-IH-4 CLASS: U DRAWER: 13
CUSTODIAN: PC
COMMENT: SOLVENT AIR ANALYSIS, URINE EXCRETION DATA SUMMARY, PCPLAR CREEK FLOW REPORTS 1955 - 1957.
- 1-266 AUTHOR: RADIATION SFTY DEPT DATE: 1963-08-31
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 2090-IH-4 CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT: DAILY SOLVENT AIR ANALYSIS, APRIL, 1961 - AUGUST, 1963.

- M-269 AUTHOR: RADIATION SFTY DEPT DATE: 1956-09-30
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 2090-IH-4 CLASS: U DRAWER: 13
CUSTODIAN: FC
COMMENT: DAILY SOLVENT AIR ANALYSIS, DECEMBER, 1955 - MAY, 1956, SEPTEMBER, 1956, 9201-4.
- M-270 AUTHOR: RADIATION SFTY DEPT DATE: 1960-12-31
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 2090-IH-4 CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT: BIO-ANALYSIS, SOLVENT CONTRCL, CARBCN TETRACHLORIDE, JANUARY, 1960 - DECEMBER, 1960.
- M-271 AUTHOR: RADIATION SFTY DEPT DATE: 1960-12-31
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 2090-IH-4 CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT: POPLAR CREEK ANALYSIS, URINE RESULTS, AIR ANALYSIS 1954 - 1960.
- M-272 AUTHOR: RADIATION SFTY DEPT DATE: 1957-12-31
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 2090-IH-4 CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT: AIR ANALYSIS, STACK SAMPLES, URINE REPORTS 1955 - 1957.
- M-275 AUTHOR: RADIATION SFTY DEPT DATE: 1957-12-31
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 2090-IH-4 CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT: DAILY SOLVENT AIR ANALYSIS, OCTOBER 2, 1956 - DECEMBER 31, 1957.
- M-276 AUTHOR: RADIATION SFTY DEPT DATE: 1957-03-29
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 2090-IH-4 CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT: DAILY SOLVENT AIR ANALYSIS, NOVEMBER 1, 1956 - MARCH 29, 1957, 9201-5.

M-277 AUTHOR: RADIATION SFTY DEPT DATE: 1957-03-29
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 2090-1H-4 CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT: DAILY SOLVENT AIR ANALYSIS 1956 - 1957.

M-278 AUTHOR: RADIATION SFTY DEPT DATE: 1957-10-31
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 2090-1H-4 CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT: DAILY SOLVENT AIR ANALYSIS.

M-279 AUTHOR: RADIATION SFTY DEPT DATE: 1956-09-28
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 2090-1H-4 CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT: DAILY SOLVENT AIR ANALYSIS, JANUARY 4, 1956 - SEPTEMBER 28, 1956, 9201-4, 9201-5, 9201-2.

M-280 AUTHOR: RADIATION SFTY DEPT DATE: 1956-09-28
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 2090-1H-4 CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT: DAILY SOLVENT AIR ANALYSIS, JANUARY 4, 1956 - SEPTEMBER 28, 1956, 9201-4, 9201-5, 9201-2.

M-281 AUTHOR: RADIATION SFTY DEPT DATE: 1957-01-31
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 2090-1H-4 CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT: AIR, URINE, PERSONNEL, 1951 - 1957, MERCURY PAPER 1951, MONTHLY SOLVENT REPORTS, PERSONNEL EXPOSURES - SOLVENT, DECONTAMINATION.

M-282 AUTHOR: RADIATION SFTY DEPT DATE: 1957-12-18
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 2090-1H-4 CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT: DAILY SOLVENT AIR ANALYSIS REPORTS, APRIL 1, 1957 - SEPTEMBER 30, 1957.

J-283 AUTHOR: RADIATION SAFETY DEPT DATE: 1956-03-29
TITLE: RADIATION SAFETY SUBJECT: HEALTH RECORDS
REPORT NUM: 29 90-TH-4 CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT: DAILY SOLVENT AIR ANALYSIS, OCTOBER 3, 1955 - MARCH 29, 1956.

J-284 AUTHOR: RADIATION SPTY DEPT DATE: 1956-06-29
TITLE: RADIATION SAFETY SUBJECT: HEALTH RECORDS
REPORT NUM: 20 90-TH-4 CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT: DAILY SOLVENT AIR ANALYSIS REPORTS APRIL 2, 1956 - JUNE 29, 1956, 9201-5.

M-285 AUTHOR: RADIATION SPTY DEPT DATE: 1957-12-31
TITLE: RADIATION SAFETY SUBJECT: HEALTH RECORDS
REPORT NUM: 20 90-TH-4 CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT: SOLVENT AIR ANALYSIS 9202, BERYLLIUM AIR ANALYSIS, MERCURY VAPOR VAC CLEANER DWGS. HP REPORTS ON BERYLLIUM, 1951 - 1957.

J-290 AUTHOR: DATE: 1965-1972
TITLE: RETURN OF LEAKING FLASKS SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: SMITH, D. W.
COMMENT: COMPILATION OF TRANSFER RECEIPTS

M-306 AUTHOR: DATE: 1965
TITLE: MERCURY QUANTITY CONTROL RECORD SUBJECT: MERCURY FLASK DATA
REPORT NUM: CLASS: C DRAWER: 8
CUSTODIAN: TRAFFIC COMMENT:
DEPT

M-307 AUTHOR: DATE: 1972 - 1982
TITLE: EXCESS LIST FECAP NO. 2567-A - DETAILS OF DISPOSAL FROM 1972-1982
SUBJECT: EQUIPMENT LIST
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: TRAFFIC DEPT
COMMENT:

M-310 AUTHOR: OSTER, H. S. DATE: 1980-07-23
TITLE: SALE OF EXCESS MERCURY BY GSA. LETTER TO G.A. RISER (DOE) FROM H.S. OSTER, JR. (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:

M-311 AUTHOR: HOLLINGSWORTH, P. E. DATE: 1964-08-26
TITLE: ABANDONMENT OF ALPHA-5 FACILITIES AT CAK RIDGE, LETTER FROM R. E. HOLLINGSWORTH (AEC) TO F. P. HAFANOWSKI (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: ORO-123741 CLASS: S DRAWER: 17
CUSTODIAN: KENDRICK, J. M.
COMMENT: TRANSMITTED FROM C. A. KELLER (AEC) TO R. P. HIBBS (UCC), SEPTEMBER 11, 1964

M-311 AUTHOR: SAPIRE, S. E. DATE: 1965-06-21
TITLE: RECLASSIFICATION OF ALPHA-5 FACILITIES, LETTER FROM S. R. SAPIRE (AEC) TO C. E. LARSON (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: KENDRICK, J. M.
COMMENT:

M-311 AUTHOR: HIBBS, P. P. DATE: 1965-09-19
TITLE: DISPOSAL OF ALPHA-5 EQUIPMENT LETTER FROM R. P. HIBBS (UCC) TO C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: KENDRICK, J. M.
COMMENT:

M-312 AUTHOR: NAPIER, J. M. DATE: 1980-01-07
TITLE: MERCURY CONTAMINATION LETTER FROM J. M. NAPIER TO H. H. STONER
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: Y/DU-48 CLASS: S DRAWER: 17
CUSTODIAN: TILSON, F. V.
COMMENT:

M-315 AUTHOR: HICKMAN, H. D. DATE: 1981-08-28
TITLE: GSA-OWNED MERCURY STORAGE, LETTER TO J. M. CASE (UCC) FROM H. D. HICKMAN (DOE)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: CONCERNING PENDING RENEWAL AGREEMENT

- M-316 AUTHOR: CASE, J. M. DATE: 1981-09-21
TITLE: MERCURY STORAGE, HANDLING & RELATED SERVICES, LETTER TO H.D. HICKMAN (DOE) FROM J.M. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL (ALSO M-369)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT: RE RENEWAL OF AGREEMENT FOR FY-82
- M-321 AUTHOR: DATE: 1977
TITLE: CERTIFICATION OF COMPLIANCE ON MERCURY STORAGE FLASKS IN BLDG. 9201-5
SUBJECT: MERCURY FLASK DATA
REPORT NUM: CLASS: U DRAWER: 8
CUSTODIAN: EBERT, T. H.
COMMENT:
- M-323 AUTHOR: TOOMEY, L. S. DATE: 1977
TITLE: MERCURY BOTTLING LAB ANALYSIS WITH PALET CARDS
SUBJECT: MERCURY FLASK DATA
REPORT NUM: CLASS: U DRAWER: 8
CUSTODIAN: CP
COMMENT:
- M-325 AUTHOR: DATE: 1968-1979
TITLE: MERCURY INFORMATION
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: C DRAWER: 5
CUSTODIAN: AKIN, J. T.
COMMENT: COMPILATION OF CONFIDENCE AND WORKSHEETS ON GSA, EXCESS, STANDBY, AND INVENTORY DATA
- M-325 AUTHOR: DEPT. OF COMMERCE DATE: 1971-06-14
TITLE: NATIONAL STOCKPILE PURCHASE SPECIFICATIONS - MERCURY
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: P-31-F2 CLASS: U DRAWER: 5
CUSTODIAN: AKIN, J. T.
COMMENT: SPECIFICATION COVERS PRIME VIRGIN MERCURY. (ALSO M-220,-393,-477)
- M-325 AUTHOR: DATE: 1976-04-19
TITLE: EQUIPMENT SPECIFICATION: MERCURY STORAGE FLASKS
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: YS-2842 CLASS: U DRAWER: 7
CUSTODIAN: AKIN, J. T.
COMMENT:

Y-326 AUTHOR: DATE: 1973 - 1975
TITLE: MERCURY INTERNAL Y12 SHIPMENT TRANSMITTERS FROM 1973-1975
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: STORES
COMMENT:

Y-327 AUTHOR: DATE: 1973
TITLE: MERCURY SHIPPING ORDERS FROM Y-12 TO OTHER ORGANIZATIONS FOR 1973
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: BAYS, STORES
COMMENT:

Y-328 AUTHOR: DATE: 1974
TITLE: MERCURY INTERNAL Y12 SHIPMENT RECEIPTS FOR 1974
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: STORES
COMMENT:

Y-331 AUTHOR: DATE: 1968
TITLE: MERCURY SHIPMENT RECEIPTS FOR 1968
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: STORES
COMMENT:

Y-332 AUTHOR: DATE: 1967
TITLE: MERCURY SHIPMENT RECEIPTS FOR 1967
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: STORES
COMMENT:

Y-333 AUTHOR: DATE: 1966
TITLE: MERCURY SHIPMENT RECEIPTS FOR 1966
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: STORES
COMMENT:

N-334 AUTHOR: DATE: 1965 - 1979
TITLE: ALPHA-5 - INVITATION, BID AND ACCEPTANCE FROM 1965-1979
SUBJECT: EQUIPMENT LIST
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: F. M. S
COMMENT:

Y-335 AUTHOR: DATE: 1965
TITLE: MERCURY INTERNAL Y12 TRANSFER RECEIPIES
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: STOFES
COMMENT:

X-344 AUTHOR: CASE, J. M. DATE: 1980-03-12
TITLE: PURITY OF MERCURY (45,000 FLASKS) TO BE TRANSFERRED TO GSA, LETTER TO H.D. HICKMAN (DOE) FROM J.M. CASE (UCC)
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT: SPECTROGRAPHIC ANALYSES

Y-345 AUTHOR: DATE: 1976
TITLE: MAINTENANCE WORK REQUEST
SUBJECT: EQUIPMENT LIST
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: ANDERSON, J. S.
COMMENT:

4-346 AUTHOR: TENCH, P. M. DATE: 1973-02-28
TITLE: BOTTLING MERCURY NOW STORED IN BLDG 9201-4, LETTER FROM P. M. TENCH TO W. DOW
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: ANDERSON, J. S.
COMMENT: LEAKING FLASKS. COST OF BOTTLING. USE OF RECONDITIONED FLASKS.

N-346 AUTHOR: SMITH, D. W. DATE: 1974-08-14
TITLE: 9201-4 STRIPPING ESTIMATES, LETTER FROM D. W. SMITH TO C. E. MUZZALL
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ANDERSON, J. S.
COMMENT: MAINTENANCE ESTIMATES. COSTS.

M-346 AUTHOR: ERDA DATE: 1976-03-15
TITLE: EXCESS MERCURY, REPORT FROM ERDA TO GSA (PROPERTY DISPOSAL FORM)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: OR76-9 CLASS: U DRAWER: 17
CUSTODIAN: ANDERSON, J. S.
COMMENT: 6,000 FLASKS. THIS IS ATTACHMENT TO HICKMAN LETTER MARCH 18, 1976

M-346 AUTHOR: NAPIER, J. M. DATE: 1976-04-22
TITLE: DECONTAMINATION OF BLDG 9201-4, LETTER FROM J. M. NAPIER TO M. DOW
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ANDERSON, J. S.
COMMENT: EXP. DEV. PLAN FOR DECONTAMINATION CP EQUIPMENT AND WASH WATER IN 9201-4. (ALSO M-760)

M-346 AUTHOR: EBERT, T. H. DATE: 1976-05-06
TITLE: ACTION PLAN FOR MERCURY FLASKING, LETTER FROM T. H. EBERT TO V. B. GRITZNER
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ANDERSON, J. S.
COMMENT: MERCURY FLASKING IN 9201-4. SUPERSEDES APR 9, 1976 PLAN. PHASE I AND II OPERATIONS DEFINED. (ALSO M-422)

M-346 AUTHOR: NAPIER, J. M. DATE: 1976-08-19
TITLE: DECONTAMINATION OF BUILDING 9201-4, REV. 1 (PRELIMINARY DRAFT) LETTER FROM J. M. NAPIER TO M. DOW
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ANDERSON, J. S.
COMMENT: COLUMN WASH TEST. (ALSO M-760)

M-346 AUTHOR: ANDERSON, J. M. DATE: 1977-01-06
TITLE: ERDA STAFF COMMITTEE ON-SITE FREOPERATIONAL TOUR OF MERCURY FLASKING OPERATIONS, JAN. 5, 1976
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ANDERSON, J. S.
COMMENT: ERDA AUTHORIZATION RECEIVED ON FLASKING. (NOTE TO FILE JAN 6, 1977 BY ANDERSON.)

M-346 AUTHOR: SPARKS, M. I. DATE: 1977-01-31
TITLE: REVIEW OF MERCURY FLASKING, LETTER FROM M. I. SPARKS TO D. J. BCSTOCK
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ANDERSON, J. S.
COMMENT: PROCEDURES AND CONTROLS PELT TO BE ADEQUATE TO MEET SPECIFICATIONS

M-346 AUTHOR: NAPIER, J. M. DATE: 1977-03-03
TITLE: DECONTAMINATION OF BUILDING 9201-4, REV. 2, LETTER FROM J. M. NAPIER TO W. DOW
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ANDERSON, J. S.
COMMENT: TEST PLAN DEVELOPMENT

M-346 AUTHOR: NAPIER, J. M. DATE: 1977-07-11
TITLE: REMOVAL OF MERCURY FROM WASTE WATERS BEFORE DUMPING TO CREEK, LETTER FROM J. M. NAPIER TO NEAL DOW
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ANDERSON, J. S.
COMMENT: WATER TREATMENT

M-346 AUTHOR: NAPIER, J. M. DATE: 1977-06-04
TITLE: RECOMMENDATIONS FOR REMOVING MERCURY FROM COLUMNS, WASH WATER AND IMPURITIES IN STORED MERCURY, LETTER FROM J. M. NAPIER TO
J. S. ANDERSON
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ANDERSON, J. S.
COMMENT: ACTION PLAN OF MAY 3, 1976. RECOMMENDED PROCEDURES.

M-347 AUTHOR: EBERT, T. H. DATE: 1977
TITLE: MERCURY FLASKING DATA
SUBJECT:
REPORT NUM: CLASS: C DRAWER: 8
CUSTODIAN: EBERT, T. H.
COMMENT:

M-348 AUTHOR: HICKMAN, H. D. DATE: 1962 - 1978
TITLE: SAFETY ANALYSIS AND FREQUENTATIONAL REVIEW OF ALPHA-4 MERCURY FLASKING OPERATIONS DURING 1962-1978
SUBJECT: MERCURY FLASK DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: ANDEESEN, J. S.
COMMENT:

M-349 AUTHOR: HICKMAN, H. D. DATE: 1979-02-06
TITLE: EXCESS MERCURY (7000 PLASKS) FOR GSA STOCKPILE STORAGE, LETTER FROM H. D. HICKMAN (AEC) TO J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL (ALSO M-382, M-393)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: YAGGI, W. J.
COMMENT: ID TAGS FOR SUBJECT MERCURY

1-350 AUTHOR: DATE: 1962
TITLE: MERCURY PLASKING - 9201-4
SUBJECT: MERCURY FLASK DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: ANDETSON, J. S.
COMMENT:

1-351 AUTHOR: DATE: 1983
TITLE: MERCURY RECORDS
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: STORES
COMMENT:

1-352 AUTHOR: GSA DATE: 1980-05
TITLE: NATIONAL STOCKPILE PROGRAM OCCUPATIONAL HEALTH GUIDELINES
SUBJECT: TECHNICAL MEMO
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: STORES
COMMENT:

1-353 AUTHOR: DATE: 1979
TITLE: MISC. MERCURY WORKSHEETS
SUBJECT: EQUIPMENT LIST
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: STORES
COMMENT:

1-354 AUTHOR: DATE: 1977 - 1980
TITLE: MERCURY SHIPPING ORDERS FROM Y-12 TO OTHER ORGANIZATIONS FROM 1977-1980
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: BAYS, STORES
COMMENT:

1-355 AUTHOR: DATE: 1981
TITLE: MERCURY SHIPPING ORDERS FROM Y-12 TO OTHER ORGANIZATIONS DURING 1981
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: BAYS, STORES
COMMENT:

M-156 AUTHOR: DATE: 1972 - 1978
TITLE: MERCURY FLASKING DATA FOR 1972-1978 IN BLDG 9201-4
SUBJECT: MERCURY FLASK DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: HEALTH SAFETY
COMMENT:

M-157 AUTHOR: DATE: 1980
TITLE: PERSONNEL LOG SHEET & SAMPLING REPORT FOR BLDG 9720-26
SUBJECT: EQUIPMENT LIST
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: STORES
COMMENT:

M-360 AUTHOR: DATE: 1979
TITLE: AIR SAMPLES AND URINALYSIS FOR MERCURY
SUBJECT: HEALTH RECORDS
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN:
COMMENT: SAFETY ANALYSIS REPORTS AND CORRESPONDENCE.

M-361 AUTHOR: DATE: 1983
TITLE: MERCURY CLEANUP, AIR SAMPLES, CONSTRUCTION ACTIVITIES 1975 THROUGH 1983
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN:
COMMENT: INDUSTRIAL HYGIENE CORRESPONDENCE AND REPORTS.

M-363 AUTHOR: DATE: 1975 - 1977
TITLE: GSA MERCURY FALLETS AT Y12 RECORD FOR 1975-1977
SUBJECT: MERCURY FLASK DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: STORES
COMMENT:

M-367 AUTHOR: DATE: 1965 - 1979
TITLE: MONTHLY GSA PALLET INVENTORY AT Y12 REPORTS FROM 1965-1979
SUBJECT: MERCURY FLASK DATA: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: STORES
COMMENT: EQUIPMENT LIST

1-368 AUTHOR: DATE: 1975-1977
TITLE: MERCURY TRANSFER RECEIPTS
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: CF
COMMENT:

1-369 AUTHOR: CASE, J. M. DATE: 1977-06-09
TITLE: MERCURY INVENTORY AT Y-12 PLANT 1950 - 1977. LETTER TO H. D. HICKMAN (ERDA) FROM J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:

1-369 AUTHOR: CASE, J. M. DATE: 1980-11-21
TITLE: MERCURY STORAGE, HANDLING & RELATED SERVICES, DOU GS-OOP-23195, LETTER TO H. D. HICKMAN (DOE) FROM J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT:

1-369 AUTHOR: HICKMAN, H. D. DATE: 1982-10-08
TITLE: EXTENSION OF AGREEMENT, LETTER TO G.G. FEE (UCC) FROM H.D. HICKMAN (DOE)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:

1-372 AUTHCP: DATE: 1965 - 1971
TITLE: MERCURY URINE CONTROLS 1965 - 1968 AND MERCURY URINE PARTICIPATION LIST
SUBJECT: HEALTH RECORDS
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN:
COMMENT:

1-374 AUTHOR: DATE: 1977
TITLE: MERCURY SHIPPING ORDERS FROM Y-12 TO OTHER ORGANIZATIONS DURING 1977
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: BAYS, STORES
COMMENT:

Y-375 AUTHOR: DATE: 1975
TITLE: TRANSFER OF ERDA MERCURY TO K-25
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: BAYS, STORES
COMMENT:

Y-376 AUTHOR: DATE: 1978
TITLE: MERCURY SHIPPING ORDERS FROM Y-12 TO OTHER ORGANIZATIONS DURING 1978
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: BAYS, STORES
COMMENT:

Y-377 AUTHOR: DATE: 1979
TITLE: MERCURY SHIPPING ORDERS FROM Y-12 TO OTHER ORGANIZATIONS DURING 1979
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: BAYS, STORES
COMMENT:

Y-378 AUTHOR: DATE: 1980
TITLE: TRANSFER OF DOE MERCURY FROM Y-12 DURING 1980
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: BAYS, STORES
COMMENT:

Y-379 AUTHOR: DATE: 1977 - 1982
TITLE: TRANSFER OF MERCURY SHIPMENTS FROM 1977-1982 WITHIN Y-12
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: CP
COMMENT:

Y-380 AUTHOR: DATE: 1981
TITLE: TRANSFER OF DOE MERCURY FROM Y-12
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: BAYS, STORES
COMMENT:

1-381 AUTHOR: MCMURRAY, D. DATE: 1982
TITLE: MERCURY SHIPPING ORDERS FRM Y-12 TO OTHER ORGANIZATIONS FROM 1982
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: BAYS, STONES
COMMENT:

1-382 AUTHOR: MCMURRAY, D. DATE: 1973-08-02
TITLE: CLEANING OF MERCURY STORAGE AREA IN BUILDING 9720-26. LETTER TO J. B. SYKES FROM D. MCMURRAY
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: (ALSC 4-393, A22)

1-382 AUTHOR: CASE, J. M. DATE: 1974-06-25
TITLE: PURITY OF GSA MERCURY, LETTER TO H. D. HICKMAN (AEC) FROM J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:

1-382 AUTHOR: HICKMAN, H. D. DATE: 1974-09-23
TITLE: GSA-OWNED MERCURY, LETTER TO J. M. CASE (UCC) FROM H. D. HICKMAN (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:

1-382 AUTHOR: HICKMAN, H. D. DATE: 1979-10-03
TITLE: EXTENSION OF AGREEMENT NO. GS-OOP-23155. LETTER TO J. M. CASE (UCC) FROM H. D. HICKMAN (DOE)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:

1-382 AUTHOR: CASE, J. M. DATE: 1979-10-12
TITLE: MERCURY STORAGE, HANDLING & RELATED SERVICES, LETTER TO H. D. HICKMAN (DOE) FROM J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: STORAGE AND HANDLING

M-382 AUTHOR: HICKMAN, H. D. DATE: 1981-04-02
TITLE: COPIES OF AMENDMENT NO. 13 TO M.O.U. NO. GS-000-23195, LETTER TO J. M. CASE (UCC) FROM H. D. HICKMAN (DOE)
SUBJECT: CORRESPONDENCE, EXTERNAL (ALSO M-314)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:

M-382 AUTHOR: HICKMAN, H. D. DATE: 1981-12-02
TITLE: AMENDMENT NO. 14 TO M.O.U. GS-000-23195, LETTER TO J. M. CASE (UCC) TO H. D. HICKMAN (DOE)
SUBJECT: CORRESPONDENCE, EXTERNAL (ALSO M-317)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:

M-382 AUTHOR: CONSIGLIO, J. T. DATE: 1982-01-18
TITLE: MEMO OF AGREEMENT NO. GS-000-23195, LETTER TO C. H. DURHAM (DOE) FROM J. T. CONSIGLIO (GSA)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:

M-382 AUTHOR: FEE, G. G. DATE: 1982-11-22
TITLE: MERCURY STORAGE, HANDLING, AND RELATED SERVICES LETTER TO H. D. HICKMAN (DOE) FROM G. G. FEE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT: STORAGE AND HANDLING

M-384 AUTHOR: SAPIRIE, S. R. DATE: 1963-12-12
TITLE: MERCURY-ACCOUNTING TREATMENT LETTER TO C.E. LARSON, (UCC) FROM S.R. SAPIRIE (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:

M-384 AUTHOR: KELLER, C. A. DATE: 1964-07-01
TITLE: EXCESS MERCURY DISPOSAL, LETTER TO R.F. HIBBS, (UCC) FROM C.A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: CONCERNING 112,050 FLASKS ONE ORDER, 20,530 ANOTHER.

M-384 AUTHOR: KELLER, C. A. DATE: 1964-08-12
TITLE: SHIPPING INSTRUCTIONS FOR 2.904 MERCURY FLASKS. LETTER TO R.P. HIBBS (UCC) FROM C.A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:

M-384 AUTHOR: KELLER, C. A. DATE: 1965-01-14
TITLE: DISPOSAL OF MERCURY. LETTER TO R.P. HIBBS (UCC) FROM C.A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: PROCEDURE TO ACCOUNT FOR COST OF GCCDS SOLD BY GSA

M-384 AUTHOR: KELLER, C. A. DATE: 1965-01-19
TITLE: PLASKING OF EXCESS MERCURY. LETTER TO R.P. HIBBS (UCC) FROM C.A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: CHANGE IN PROCEDURE TO REQUIRE PICKLING AND PAINTING.

M-384 AUTHOR: KELLER, C. A. DATE: 1968-01-17
TITLE: REQUEST FOR ESTIMATE FOR PLASKING 15,764 FOR TRANSFER TO GSA FOR SALE. LETTER TO J.M. CASE (UCC) FROM C.A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: THIS IS FOR THE PORTION "STILL IN THE PROCESS SYSTEM".

M-384 AUTHOR: KELLER, C. A. DATE: 1968-03-05
TITLE: MERCURY PLASKING REQUEST (15,764 FLASKS). LETTER TO J. M. CASE (UCC) FROM C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:

M-385 AUTHOR: DATE: 1977
TITLE: MERCURY TRANSFER RECEIPT
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 6
CUSTODIAN: BAYS, STORES
COMMENT:

M-386 AUTHCR: TITLE: MERCURY SHIPPING ORDERS FPCM Y-12 TO CTHR ORGANIZATIONS FROM 1963 - 1965
SUBJ/BCT: MERCURY SHIPMENT DATA
PEPPCRT NUM:
CUSTODIAN: BAYS, STORES CLASS: U DRAWER: 6
COMMENT:

M-387 AUTHOR: TITLE: MERCURY QUANTITY CONTROL - GSA STOCKPILE FROM 1965-1977
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM:
CUSTODIAN: BAYS, STORES CLASS: U DRAWER: 6
COMMENT:

M-388 AUTHOR: TITLE: MERCURY SHIPPING ORDERS FROM Y-12 TO CTHR ORGANIZATIONS FROM 1964-1970
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM:
CUSTODIAN: BAYS, STORES CLASS: U DRAWER: 6
COMMENT:

M-389 AUTHOR: KELLER, C. A. DATE: 1964-01-02
TITLE: MERCURY TRANSFER TO GSA, LETTER FROM C. A. KELLER (AEC) TO R. P. HIBBS (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM:
CUSTODIAN: BAYS, M. C. CLASS: U DRAWER: 17
COMMENT: 10.000 FLASKS OF MERCURY SHIPPED TO GSA.

M-389 AUTHOR: KELLER, C. A. DATE: 1964-03-09
TITLE: MERCURY FOR GSA, LETTER FROM C. A. KELLER (AEC) TO R. P. HIBBS (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM:
CUSTODIAN: BAYS, M. C. CLASS: U DRAWER: 17
COMMENT: 52,000 FLASKS OF MERCURY TRANSFERRED TO GSA.

M-389 AUTHOR: KELLER, C. A. DATE: 1964-06-04
TITLE: MERCURY FOR GSA, LETTER FROM C. A. KELLER (AEC) TO R. P. HIBBS (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM:
CUSTODIAN: BAYS, M. C. CLASS: U DRAWER: 17
COMMENT: 8,359 FLASKS OF MERCURY TO BE SHIPPED TO GSA

- A-389 AUTHOR: KELLER, C. A. DATE: 1965-01-19
TITLE: PLASKING OF EXCESS MERCURY, LETTER FRM C. A. KELLER (AEC) TO R. P. HIBBS (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: BAYS, M. C.
COMMENT: PLANS TO PROCESS AND STORE USABLE FLASKS
- H-389 AUTHOR: HIBBS, R. F. DATE: 1965-05-07
TITLE: MERCURY HANDLING AT THE Y-12 PLANT, LETTER FROM R. P. HIBBS (UCC) TO C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: BAYS, M. C.
COMMENT: PROTECTION OF MERCURY INVENTORY
- Y-389 AUTHOR: KELLER, C. A. DATE: 1965-05-25
TITLE: SURPLUS MERCURY, LETTER FRM C. A. KELLER (AEC) TO R. P. HIBBS (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: BAYS, M. C.
COMMENT: GSA AGREED TO ACCEPT 33,361 FLASKS FOR DISPOSAL
- H-389 AUTHOR: KELLER, C. A. DATE: 1965-06-16
TITLE: MERCURY HANDLING AT THE Y-12 PLANT, LTR FROM C. A. KELLER (AEC) TO R. P. HIBBS (UCN)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: BAYS, M. C.
COMMENT: AEC CCNCURS IN ADOPTION OF MERCURY-HANDLING PROCEDURES.
- Y-389 AUTHOR: KELLER, C. A. DATE: 1966-05-06
TITLE: TRANSFEE IN-PLACE OF MERCURY TO GSA, LETTER FROM C. A. KELLER (AEC) TO R. P. HIBBS (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: BAYS, M. C.
COMMENT: AUTHORIZES TRANSFER OF 37,700 FLASKS.
- H-389 AUTHOR: KELLER, C. A. DATE: 1966-06-27
TITLE: MEMO OF AGREEMENT BETWEEN GSA AND AEC, LETTER FROM C. A. KELLER (AEC) TO R. P. HIBBS (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: BAYS, M. C.
COMMENT: AGREEMENT COVERS STORAGE, HANDLING, AND RELATED SERVICES IN CONNECTION WITH MERCURY STORED FOR GSA

M-389 AUTHOR: KELLER, C. A. DATE: 1966-12-28
TITLE: AUTHORIZATION TO RELEASE 20,000 FLASKS OF MERCURY TO GSA, LETTER FROM C. A. KELLER (AEC) TO R. P. HIBBS (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: BAYS, M. C.
COMMENT: (ALSO M-384)

M-389 AUTHOR: HICKMAN, H. D. DATE: 1976-03-18
TITLE: EXCESSING OF MERCURY FOR DISPOSAL BY GSA, LETTER FROM H. D. HICKMAN (ERDA) TC J. H. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: BAYS, M. C.
COMMENT: ERDA DECLARED 6,000 FLASKS OF MERCURY EXCESS. (ALSO M-389, -353, -422)

M-389 AUTHOR: EBERT, T. H. DATE: 1976-05-06
TITLE: ACTION PLAN FOR MERCURY FLASKING, LTP FRM T. H. EBERT TO V. B. GRITZNER.
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: BAYS, M. C.
COMMENT: PLAN FOR 9201-4 IN TWO PHASES. (ALSC M-422)

M-390 AUTHOR: EBERT, J. W. DATE: 1971-02-11
TITLE: MERCURY INCIDENT IN 9201-2, MERCURY CONTAMINATION STUDY
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: CLASS: C DRAWER: 10
CUSTODIAN: WILSON, T. C.
COMMENT:

M-391 AUTHOR: BAYS, M. C. DATE: 1976-06-05
TITLE: UCC & ORO MEETINGS ON REMOVAL OF MERCURY FROM ALPHA-4
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: STORAGE OF GSA & ERDA OWNED MERCURY

M-391 AUTHOR: BAYS, M. C. DATE: 1976-06-15
TITLE: UCC/DOE MEETING ON REMOVAL OF MERCURY FROM ALPHA-4
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:

- M-391 AUTHOR: WING, J. F. DATE: 1976-07-28
SUBJECT: FLASKING AND STORAGE PROCEDURES, EXTERNAL REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP COMMENT: PROCEDURE FOR STORAGE & FLASKING OF GSA OWNED MERCURY AT UCC. (ALSO M-760, -783)
- M-392 AUTHOR: DOW, N. DATE: 1959-02-18
TITLE: ALPHA-5 SHUTDOWN, LETTER TO R.A. WALKER FROM NEAL DOW
SUBJECT: CORRESPONDENCE, INTERNAL REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP COMMENT: PLANS FOR PUTTING BUILDING IN STANCFY
- M-392 AUTHOR: JENNINGS, D. A. DATE: 1965-02-04
TITLE: PLANNING FOR STRIPPING CP BUILDING 9201-5, LETTER TO J.W. EBERT FROM D.A. JENNINGS
SUBJECT: CORRESPONDENCE, INTERNAL REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP COMMENT:
- M-392 AUTHOR: SYKES, J. B. DATE: 1965-05-21
TITLE: ALPHA-5 STRIPPING, LETTER TO D.A. JENNINGS FROM J.B. SYKES
SUBJECT: CORRESPONDENCE, INTERNAL REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP COMMENT: PERSONNEL PROTECTION RECOMMENDATIONS AND PLANS
- M-392 AUTHOR: HIBBS, R. P. DATE: 1965-07-16
TITLE: ALPHA-5 SCRAP DISPOSAL, LETTER TO C.A. KELLER (AEC) FROM R.P. HIBBS (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP COMMENT: SCRAP YARD INVENTORY, FEADY FOR DISFC5AL
- M-392 AUTHOR: NOOK, J. C. DATE: 1975-05-19
TITLE: MERCURY REMOVAL BUILDING 9201-4, LETTER TO D.W. SMITH FROM J.C. NOOK
SUBJECT: CORRESPONDENCE, INTERNAL REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP COMMENT:

Y-393 AUTHOR: MC GUIRE, P. DATE: 1959-04-07
TITLE: AGREEMENT BETWEEN DEPARTMENT OF DEFENSE AND GSA ON INTERAGENCY CROSS-SERVICING IN STORAGE ACTIVITIES
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

Y-393 AUTHCR: GSA DATE: 1959-04-07
TITLE: GSA REGULATION ON INTERAGENCY CROSS-SERVICING IN STORAGE ACTIVITIES
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

Y-393 AUTHOR: KELLER, C. A. DATE: 1963-03-29
TITLE: GSA PROCEDURE TO THE STORAGE OF MERCURY, LETTER TO R. P. HIBBS (UCC), FROM C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: STORAGE PROCEDURES

Y-393 AUTHOR: SAPIRIE, S. R. DATE: 1963-12-12
TITLE: MERCURY - ACCOUNTING, LETTER TO C. E. LARSON (UCC), FROM S. R. SAPIRIE (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: ACCOUNTING

Y-393 AUTHOR: KELLER, C. A. DATE: 1964-05-18
TITLE: EXCESS MERCURY DISPOSAL, LETTER R. P. HIBBS (UCC), FROM C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: DISPOSAL

Y-393 AUTHOP: JOHNSON, V. E. DATE: 1965-04-07
TITLE: COST RATE ON WAREHOUSE STORAGE OF STOCKPILE MATERIALS, LETTER FROM V. E. JOHNSON (GSA) TO DAN POLLEY (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

M-393 AUTHOR: HIBBS, R. F. DATE: 1965-05-07
TITLE: MERCURY HANDLING AT THE Y-12 PLANT. LETTER TO C. A. KELLER (ABC). FROM R. F. HIBBS (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: HANDLING PROCEDURES

M-393 AUTHOR: GCODE, E. E. DATE: 1965-08-13
TITLE: MERCURY LOSS BY MERRIAM INSTRUMENT COMPANY, LETTER TO W. P. KEYERLEBER (MIC). FROM E. E. JOODE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: MERCURY LOSS

M-393 AUTHOR: KELLER, C. A. DATE: 1968-01-17
TITLE: GSA MERCURY PALLETS. LETTER TO J. H. CASE (DOE). FROM C. A. KELLER (DOE)
SUBJECT: CORRESPONDENCE
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

M-393 AUTHOR: SYKES, J. B. DATE: 1968-01-31
TITLE: GSA MERCURY PALLETS. LETTER TO J. H. CASE (UCC). FROM C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: (ALSO M-422)

M-393 AUTHOR: KELLER, C. A. DATE: 1968-03-05
TITLE: GSA MERCURY PALLETS. LETTER TO J. H. CASE (UCC). FROM C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

M-393 AUTHOR: KELLEY, C. A. DATE: 1969-09-30
TITLE: MERCURY PLASKS. LETTER TO J. H. CASE (UCC). FROM C. A. KELLER, (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: PLASKS

M-393 AUTHOR: KELLER, C. A. DATE: 1971-05-25
TITLE: MERCURY REQUIREMENTS, LETTER TO J. H. CASE (UCC) FROM C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: MCMURRAY, D.
COMMENT:

M-393 AUTHOR: HICKMAN, H. D. DATE: 1972-07-13
TITLE: STORAGE, HANDLING, RELATED SERVICE FOR GSA, LETTER TO J. H. CASE (UCC), FROM H. D. HICKMAN (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: MCMURRAY, D.
COMMENT: STORAGE & HANDLING

M-393 AUTHOR: HICKMAN, H. D. DATE: 1973-07-02
TITLE: FY 74 PRICES FOR MERCURY STORAGE, HANDLING, AND RELATED SERVICE, LETTER TO J. H. CASE (UCC), FROM H. D. HICKMAN (DOE)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: MCMURRAY, D.
COMMENT: STORAGE AND HANDLING

M-393 AUTHOR: CASE, J. H. DATE: 1973-07-20
TITLE: FY 74 PRICES FOR MERCURY STORAGE, HANDLING, AND RELATED SERVICE, LETTER TO H. D. HICKMAN, (DOE), FROM J. H. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: MCMURRAY, D.
COMMENT: PRICES FOR STORAGE AND HANDLING

M-393 AUTHOR: CASE, J. H. DATE: 1973-07-20
TITLE: FY 74 PRICES FOR MERCURY STORAGE, HANDLING, AND RELATED SERVICE, LETTER TO H. D. HICKMAN (DOE), FROM J. H. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: MCMURRAY, D.
COMMENT: STORAGE & HANDLING

M-393 AUTHOR: MAYFIELD, A. L. DATE: 1973-10-02
TITLE: GSA MERCURY, MEMO TO FILE (ERDA), FROM A. L. MAYFIELD (ERDA)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: MCMURRAY, D.
COMMENT:

N-393 AUTHOR: BRADSHAW, H. R. DATE: 1974-05-27
TITLE: MERCURY STORED IN BLDG. 9720-26. MEMO TO FILE (UCC). FROM H. R. BRADSHAW (UCC)
SUBJECT: CORRESPONDENCE, INTERNAL.
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: STORAGE

N-393 AUTHOR: HICKMAN, H. D. DATE: 1974-06-10
TITLE: PURITY OF GSA MERCURY. LETTER TO J. N. CASE (UCC), FROM H. D. HICKMAN (DOE)
SUBJECT: CORRESPONDENCE, EXTERNAL.
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

N-393 AUTHOR: BIAGIOTTI, L. A. DATE: 1974-06-11
TITLE: WAREHOUSING AND SHIPMENT OF GSA-OWNED MERCURY. MEMO TO FILE (DOE), FROM L. A. BIAGIOTTI (DOE)
SUBJECT: CORRESPONDENCE, EXTERNAL.
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: STORAGE & SHIPMENT

N-393 AUTHOR: SMITH, D. W. DATE: 1974-06-17
TITLE: REBOTTLING OF GSA MERCURY. LETTER TO J. B. SYKES FROM D. W. SMITH
SUBJECT: CORRESPONDENCE, INTERNAL.
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

N-393 AUTHOR: EVERETT, W. S., JR. DATE: 1974-06-17
TITLE: SURVEY OF BUILDING 9720-26 FOR MERCURY VAPOR. LETTER TO J. B. SYKES FROM W. S. EVERETT, JR.
SUBJECT: CORRESPONDENCE, INTERNAL.
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: AIR MEASUREMENTS FOR 9720-26

N-393 AUTHOR: HICKMAN, H. D. DATE: 1974-06-27
TITLE: FY 74 PRICES FOR MERCURY STORAGE, HANDLING, AND RELATED SERVICE, LETTER TO J. N. CASE (UCC) FROM H. D. HICKMAN (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL.
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

4-393 AUTHOR: CASE, J. H. DATE: 1974-07-15
TITLE: MERCURY STORAGE, HANDLING, AND RELATED SERVICES UNDER MEMORANDUM OF AGREEMENT NO. GS-DOP-23195 (SCM). LETTER TO H. D. HICKMAN (AEC), FROM J. H. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: (ALSO H-382, -477)

4-393 AUTHOR: EVERETT, W. S., JR. DATE: 1974-07-24
TITLE: AIR MEASUREMENTS FOR MERCURY VAPOR IN BLDG. 9720-26, LETTER TO J. B. SYKES, FROM W. S. EVERETT, JR.
SUBJECT: CORRESPONDENCE, INTERNAL REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: AIR MEASUREMENTS FOR 9720-26

4-393 AUTHOR: BRADSHAW, M. R. DATE: 1974-08-26
TITLE: INSPECTION OF MERCURY STORAGE AREA, LETTER TO E. A. PLUHAR FROM M. R. BRADSHAW
SUBJECT: CORRESPONDENCE, INTERNAL REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

4-393 AUTHOR: SYKES, J. B. DATE: 1974-09-13
TITLE: MERCURY SHIPMENTS, LETTER TO M. C. BAYS, ET AL. FROM J. B. SYKES
SUBJECT: CORRESPONDENCE, INTERNAL REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

4-393 AUTHOR: HICKMAN, H. D. DATE: 1974-09-23
TITLE: REFLASKING OF MERCURY, LETTER TO J. H. CASE (UCC). FROM H. D. HICKMAN (DOE)
SUBJECT: CORRESPONDENCE, EXTERNAL REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: REFLASKING

4-393 AUTHOR: HICKMAN, H. D. DATE: 1974-09-23
TITLE: REFLASKING OF MERCURY, LETTER TO J. H. CASE (UCC) FROM H. D. HICKMAN (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

Y-393 AUTHOR: HICKMAN, H. D. DATE: 1975-03-05
TITLE: REFLASKING LEAKING FLASKS, LETTER TO J. M. CASE (UCC). FROM H. D. HICKMAN (ERDA)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

Y-393 AUTHOR: MAYFIELD, A. L. DATE: 1975-03-13
TITLE: REFLASING OF GENERAL SERVICES ADMINISTRATION MERCURY, LETTER TO FILES (ERDA), FROM A. L. MAYFIELD (ERDA)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: (ALSC M-81)

Y-393 AUTHOR: CASE, J. M. DATE: 1975-04-08
TITLE: RETURN OF Y-12 MERCURY TO NATIONAL STOCKPILE, LETTER FROM J. M. CASE (UCC) TO H. D. HICKMAN (ERDA)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: INCREASE IN BUDGET ESTIMATE FOR REFLASKING (WITH NUMBERS OF FLASKS)

Y-393 AUTHOR: CASE, J. M. DATE: 1975-04-08
TITLE: MERCURY STORAGE, HANDLING, AND RELATED SERVICES UNDER MEMORANDUM OF AGREEMENT, LETTER TO H. D. HICKMAN (ERDA), FROM J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

Y-393 AUTHOR: CASE, J. M. DATE: 1975-04-11
TITLE: MERCURY REFLASKING, LETTER TO H. D. HICKMAN (ERDA), FROM J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: INFORMATION ON INCREASE IN BUDGET ESTIMATE IN NUMBERED AMOUNT OF REFLASKED MERCURY

Y-393 AUTHOR: CASE, J. M. DATE: 1975-05-08
TITLE: POSSIBLE SALE OF MERCURY, LETTER TO H. D. HICKMAN (ERDA), FROM J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: SCHEDULE INFORMATION ON BOTTLING OF MERCURY FLASKS. (ALSO M-382)

- M-393 AUTHOR: CASE, J. M. DATE: 1975-05-23
TITLE: REMOVAL OF MERCURY FROM PROCESS EQUIPMENT IN ALPHA-4, LETTER FROM J. M. CASE (UCC) TO H. D. HICKMAN (ERDA)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: SCHEDULE AND COSTS FOR DRAINING AND BOTTLING. (ALSO M-220, -477)
- M-393 AUTHOR: HICKMAN, H. D. DATE: 1975-10-02
TITLE: REPLASKING OF GSA-OWNED MERCURY - 2276 FLASKS, LETTER FROM H. D. HICKMAN (ERDA) TO J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: ERDA ALLOCATION OF FUNDS AND CONDITIONS. (ALSO M-382)
- M-393 AUTHOR: BIAGIOTTI, L. A. DATE: 1976-03-15
TITLE: ERDA EXCESS PROPERTY LIST, FROM ERDA TO GSA
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: AMOUNTS OF PLASKED MERCURY TO BE STORED AT Y-12
- M-393 AUTHOR: CASE, J. M. DATE: 1976-04-21
TITLE: PROPOSED MERCURY FLASK SPECIFICATION, LETTER FROM J. M. CASE (UCC) TO H. D. HICKMAN (ERDA)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: UCC/ERDA MEETING CONCERNING A MORE DETAILED SPECIFICATION FOR QUALITY OF FLASK IN LONG-TERM STORAGE. (ALSO M-422, -783)
- M-393 AUTHOR: ANDERSON, J. S. DATE: 1976-06-02
TITLE: ACTION PLAN FOR MERCURY FLASKING SAFETY ANALYSIS REPORT, LETTER FROM J. S. ANDERSON TO V. B. GRITZNER
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: REMOVAL OF MERCURY FROM PROCESS EQUIPMENT IN ALPHA-4. (ALSO M-422)
- M-393 AUTHOR: CASE, J. M. DATE: 1976-07-28
TITLE: EXCESSING OF MERCURY FOR DISPOSAL BY GSA, LETTER TO H. D. HICKMAN (ERDA), FROM J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: SCHEDULE FOR 1976 MERCURY FLASKING BY NORRIS INDUSTRIES. (ALSC M-760)

1-393 AUTHOR: HOOD, W. B. DATE: 1976-09-22
TITLE: SALE OF SCRAP MERCURY FLASKS. LETTER TO D. R. MCCAMMON FROM W. B. HOOD
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

4-393 AUTHOR: McMURRAY, D. DATE: 1976-10-25
TITLE: SALE OF SCRAP MERCURY FLASK, LETTER TO M. R. BRADSHAW (K-25). FROM DON McMURRAY (Y-12)
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

M-393 AUTHOR: HICKMAN, H. D. DATE: 1977-10-19
TITLE: EXTENSION OF THE GSA AGREEMENT. LETTERS TO J. A. CASE. (UCC). FROM H. D. HICKMAN (GCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

4-393 AUTHOR: HICKMAN, H. D. DATE: 1978-01-26
TITLE: COPY OF AMENDMENT #10 TO MOU #GS-00P-23195(SCH). LETTER TO J. A. CASE (UCC) FROM H. D. HICKMAN (ORO)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

M-393 AUTHOR: REYNOLDS, H. DATE: 1978-07-17
TITLE: SALE OF SCRAP MERCURY FLASKS. LETTER TO D. A. McCAMMON (PURCHASING) FROM H. REYNOLDS (GCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: SALES OF FLASKS

M-393 AUTHOR: MAYFIELD, A. L. DATE: 1978-12-06
TITLE: YOU BETWEEN AEC & GSA: STORAGE & HANDLING OF MERCURY AND LITHIUM. MEMO TO D. McMURRAY (UCC) FROM A. L. MAYFIELD (ORG)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: STORAGE & HANDLING OF MERCURY

M-393 AUTHOR: SYKES, J. B. DATE: 1979-03-09
TITLE: EXCESS MERCURY (7,000 PLASKS) FOR GSA STOCKPILE STORAGE, LETTER FROM J. B. SYKES TO H. F. SMITH
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

M-393 AUTHOR: CASE, J. H. DATE: 1979-06-18
TITLE: DO-E-OWNED MERCURY FOR SALE BY GSA, LETTER TO H. D. HICKMAN (DOE) FROM J. H. CASE (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

M-393 AUTHOR: COX, J. K. DATE: 1980-02-07
TITLE: REQUEST FOR CERTIFIED PURITY ANALYSIS - 45,000 PLASKS OF MERCURY, LETTER TO H. DOW FROM J. K. COX
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT: (ALSO M-422)

M-393 AUTHOR: CASE, J. H. DATE: 1980-03-12
TITLE: DO-E-OWNED MERCURY FOR SALE BY GSA, LETTER TO H. D. HICKMAN (DOE) FROM J. H. CASE (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

M-393 AUTHOR: GSA DATE: 1981-10-26
TITLE: GSA NEWS RELEASE. AWARD OF CONTRACT FOR SALE OF DOE MERCURY
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

M-393 AUTHOR: McMURRAY, D. DATE: 1983-01-31
TITLE: GSA MERCURY STORAGE BILLING, LETTER TO W. T. CARTER FROM D. MCNURRAY
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McMURRAY, D.
COMMENT:

Y-393 AUTHOR: YAGGI, W. J. DATE: 1983-03-04
TITLE: MERCURY CLEANUP LETTER FRM W. J. YAGGI TO G. L. BEAN ET AL.
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: MCMLURRAY, D.
COMMENT: MEETING SUMMARY OF ALPHA-5 CLEANUP

Y-394 AUTHOR: DATE: 1965
TITLE: MERCURY SHIPPING LCG BOOKS
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: FUNCEL, E.
COMMENT:

Y-395 AUTHOR: DATE: 1968 - 1972
TITLE: MERCURY SHIPPING ORDERS FROM Y-12 TO OTHER ORGANIZATIONS FROM 1968-1972
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: BAYS, STORES
COMMENT:

Y-396 AUTHOR: DATE: 1968 - 1971
TITLE: MERCURY SHIPMENT TRANSMITTALS FROM 1968-1971 - IN HOUSE
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: BAYS, STORES
COMMENT:

Y-398 AUTHOR: DATE: 1968 - 1969
TITLE: MERCURY SHIPPING ORDERS FROM Y-12 TO OTHER ORGANIZATIONS FROM 1968-1969
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: BAYS, STORES
COMMENT:

Y-399 AUTHOR: DATE: 1967 - 1968
TITLE: MERCURY SHIPPING ORDERS FROM Y-12 TO OTHER ORGANIZATIONS FROM 1967-1968
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: BAYS, STORES
COMMENT:

Y-400 AUTHOR: DATE: 1966 - 1967
TITLE: MERCURY SHIPPING ORDERS FROM Y-12 TO OTHER ORGANIZATIONS FROM 1966-1967
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: BAYS, STORES
COMMENT:

Y-401 AUTHOR: DATE: 1965 - 1966
TITLE: MERCURY SHIPPING ORDERS FROM Y-12 TO OTHER ORGANIZATIONS FROM 1965-1966
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: BAYS, STORES
COMMENT:

Y-403 AUTHOR: DATE: 1963
TITLE: MERCURY SHIPPING ORDERS FROM Y-12 TO OTHER ORGANIZATIONS DURING 1963
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: BAYS, STORES
COMMENT:

Y-405 AUTHOR: DATE: 1965 - 1967
TITLE: MONTHLY MERCURY STORAGE PALLET INVENTORY REPORT FROM 1965 - 1967
SUBJECT: MERCURY FLASK DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: BAYS, STORES
COMMENT:

Y-406 AUTHOR: DATE: 1964
TITLE: MERCURY SHIPPING ORDERS FROM Y-12 TO OTHER ORGANIZATIONS DURING 1964
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: BAYS, STORES
COMMENT:

Y-407 AUTHOR: DATE: 1962
TITLE: MERCURY SHIPPING ORDERS FROM Y-12 TO OTHER ORGANIZATIONS DURING 1962
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: BAYS, STORES
COMMENT:

- 1-4-09 AUTHOR: DATE: 1976
TITLE: MERCURY FLASKING FOR 9201-4 - SAFETY ANALYSIS AND PREOPERATIONAL REVIEW OF ALPHA-4 MERCURY FLASKING OPERATION
SUBJECT: MERCURY FLASK DATA. Y/MA-5556.
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN:
COMMENT: CORRESPONDENCE AND REPORTS - ACTION PLAN FOR MERCURY FLASKING.
- 1-4-10 AUTHOR: DATE: 1966
TITLE: BOTTLING AND HANDLING COSTS RELATED TO EXCESS MERCURY
SUBJECT: MERCURY FLASK DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: BAYS, STORES
COMMENT:
- 1-4-15 AUTHOR: DATE: 1966
TITLE: MERCURY SHIPPING ORDERS FROM Y-12 TO OTHER ORGANIZATIONS FROM 1964 - 1966
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: BAYS - STCRES
COMMENT:
- 1-4-16 AUTHOR: DATE: 1965-1966
TITLE: PICKLING AND PAINTING COSTS - MERCURY FLASKS
SUBJECT: MERCURY FLASK DATA
REPORT NUM: CLASS: U DRAWER: 8
CUSTODIAN: CP
COMMENT: FOLDER CONTAINS Y-12 WORK ORDER REPORTS
- 1-4-17 AUTHOR: DATE: 1975
TITLE: ENVIRONMENTAL MONITORING REPORT USE ENERGY RESEARCH AND DEVELOPMENT ADM. OAK RIDGE FACILITIES
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y/UB-4 CLASS: U DRAWER: 10
CUSTODIAN: CF
COMMENT:
- 1-4-18 AUTHOR: DATE: 1976
TITLE: ENVIRONMENTAL MONITORING REPORT USE ENERGY RESEARCH AND DEVELOPMENT ADM. OAK RIDGE FACILITY
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y/UB-6 CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT:

M-420 AUTHOR: WALDROP, F. B. DATE: 1968-02-15
TITLE: DESCRIPTION OF Y-12 PROCESSES FOR SEPARATING LITHIUM ISOTOPES
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: Y-DA-2098 CLASS: S DRAWER: 10
CUSTODIAN: WALDROP, F. B.
COMMENT:

Y-421 AUTHOR: WALDROP, F. B. DATE: 1968-02-15
TITLE: DESCRIPTION OF Y-12 PROCESSES FOR SEPARATING LITHIUM ISOTOPES
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-DA-2098 CLASS: S DRAWER: 15
CUSTODIAN: WALDROP, F. B.
COMMENT:

Y-421 AUTHOR: KITE, H. T. DATE: 1975-12
TITLE: LITHIUM ISOTOPE SEPARATION TECHNOLOGY STUDY FOR EAGLE-PICHER IND., INC.
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y/AJ-154 CLASS: C DRAWER: 10
CUSTODIAN:
COMMENT:

Y-422 AUTHOR: KELLER, C. A. DATE: 1963-03-29
TITLE: STORAGE OF MERCURY, LETTER TO R. F. HIBBS (UCC) FROM C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT:

Y-422 AUTHOR: BAYS, M. C. DATE: 1966-03-30
TITLE: BOTTLING AND HANDLING COSTS RELATED TO EXCESS MERCURY LETTER FROM M. C. BAYS TO J. K. DENTON
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT: ALSO M-393

Y-422 AUTHOR: MOREHEAD, J. F. DATE: 1973-07-27
TITLE: AIR MEASUREMENTS TAKEN IN BUILDING 9720-26, LETTER TO D. McMURRAY FROM J. F. MOREHEAD
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT:

M-422 AUTHOR: BRADSHAW, M. R. DATE: 1974-05-24
TITLE: MINUTES OF MEETING ON MERCURY, MEMO TO FILE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:

M-422 AUTHOR: BIAGIOTTI, L. A. DATE: 1974-06-11
TITLE: WAREHOUSING AND SHIPMENT OF GSA-OWNED MERCURY LETTER TO H. D. HICKMAN (UCC) FROM L. A. BINGIOTTI (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:

M-422 AUTHOR: SYKES, J. B. DATE: 1974-09-13
TITLE: MERCURY SHIPMENTS, LETTER TO M. R. BRADSHAW FROM J. B. SYKES
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:

M-422 AUTHOR: HICKMAN, H. D. DATE: 1974-09-23
TITLE: GSA OWNED MERCURY, LETTER J. M. CASE (UCC) FROM H. D. HICKMAN (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:

M-422 AUTHOR: EBERT, T. H. DATE: 1976-05-20
TITLE: ACTION PLAN FOR MERCURY PLASKING SAFETY ANALYSIS REPORT, LETTER TO V. B. GRITZNER (UCC) FROM J. S. ANDERSON (UCC)
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: (ALSO M-346)

M-422 AUTHOR: CHARLES, J. W. DATE: 1980-02-15
TITLE: ANALYSIS OF MERCURY, LETTER TC N. DOW (UCC) FROM J. W. CHARLES (UCC)
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:

Y-423 AUTHOR: DATE: 1964
TITLE: MERCURY SHIPPING CADDERS FROM Y-12 TO OTHER ORGANIZATIONS DURING 1964
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: BAYS - STORES
COMMENT:

Y-424 AUTHOR: DATE: 1965
TITLE: STORE MATERIAL TRANSFER
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: BAYS - STORES
COMMENT:

Y-425 AUTHOR: DATE: 1968
TITLE: ALPHA 5 SHIPPING AND 1968 SALES (UCNC 946)
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. H.
COMMENT:

Y-426 AUTHOR: DATE: 1966
TITLE: DELIVERY OR SHIPPING NOTIFICATION ON MERCURY-CONTAMINATED RASCHIG RINGS & COLUMN GRATING
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: BAYS - STORES
COMMENT:

Y-427 AUTHOR: DATE: 1965 - 1967
TITLE: PROCEDURE FOR THE FINANCIAL CONTROL OF 9201-5 STRIPPING FROM 1965 - 1967
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: ACC RECORDS
COMMENT:

Y-428 AUTHOR: DATE: 1965
TITLE: EQUIPMENT STRIPPED FROM ALPHA-5 - SALE FOR 1965
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: ACC RECORDS
COMMENT:

- N-430 AUTHOR: DATE: 1972-1973
TITLE: SALE UCC-ND-2085 TO MALLORY BATTERY COMPANY
SUBJECT: MERCURY SHIPMENT DATA CLASS: U DRAWER: 7
REPORT NUM: REPORT LIST
CUSTODIAN: CP
COMMENT: INVITATION TO BID AND SHIPPING ORDERS
- Y-431 AUTHOR: DATE: 1955
TITLE: EXCESS PROPERTY CHECK LIST IN BLDG. 9201-5
SUBJECT: EQUIPMENT LIST CLASS: U DRAWER: 8
REPORT NUM: REPORT LIST
CUSTODIAN: RCC RECORDS
COMMENT:
- Y-432 AUTHOR: DATE: 1955-10
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR OCT. 1955
SUBJECT: MONTHLY REPORT, ALLOY DIV. CLASS: S DRAWER: 4
REPORT NUM: Y-F40-10
CUSTODIAN: CP
COMMENT:
- N-433 AUTHOR: DATE: 1955-01
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR JAN. 1955
SUBJECT: WEEKLY REPORT, ALLOY DIV. CLASS: S DRAWER: 4
REPORT NUM: Y-F40-11
CUSTODIAN: CP
COMMENT:
- N-434 AUTHOR: DRAKE, H. J. DATE: 1981
TITLE: MERCURY
SUBJECT: OPEN LITERATURE CLASS: U DRAWER: 19
REPORT NUM:
CUSTODIAN: CP
COMMENT: PHYSICAL AND CHEMICAL PROPERTIES OF MERCURY
- Y-435 AUTHOR: DATE: 1955-02
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR FEB. 1955
SUBJECT: WEEKLY REPORT, ALLOY DIV. CLASS: S DRAWER: 4
REPORT NUM: Y-F40-12
CUSTODIAN: CP
COMMENT:

Y-436 AUTHOR: DATE: 1955-03
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR MARCH 1955
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-13 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-437 AUTHOR: MILLS, J. H. DATE: 1983-04-27
TITLE: STRIPPING OF BLDG 9201-4/CLEANUP ACTIVITIES, LETTER FROM J. H. MILLS TO J. C. WHITE
SUBJECT: CORRESPONDENCE, INTERNAL REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP
COMMENT: RECLASSIFICATION PROBLEMS

Y-438 AUTHOR: DATE: 1978
TITLE: ENVIRONMENTAL MONITORING REPORT US DOE OAK RIDGE FACILITY
SUBJECT: TECHNICAL MEMO REPORT NUM: Y/UB-1n CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-439 AUTHOR: DATE: 1980
TITLE: ENVIRONMENTAL MONITORING REPORT US DOE OAK RIDGE FACILITY
SUBJECT: TECHNICAL MEMO REPORT NUM: Y/UB-15 CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-440 AUTHOR: DATE: 1981
TITLE: ENVIRONMENTAL MONITORING REPORT US DOE OAK RIDGE FACILITY
SUBJECT: TECHNICAL MEMO REPORT NUM: Y/UB-16 CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-441 AUTHOR: KITE, H. T. DATE: 1958-02
TITLE: EFFECTS OF IMPURITIES IN THE COLEX PROCESS
SUBJECT: TECHNICAL MEMO REPORT NUM: Y-1192 CLASS: C DRAWER: 10
CUSTODIAN: CP
COMMENT:

4-442 AUTHOR: BEEN, S. P. DATE: 1953-06
TITLE: STATUS AND TECHNICAL FEASIBILITY REPORT ON THE COLEX PROCESS PROGRESS THROUGH JUNE 1953
SUBJECT: TECHNICAL REPORTS/NEMOS
REPORT NUM: Y-98A CLASS: C DRAWER: 10
CUSTODIAN:
COMMENT:

4-443 AUTHOR: OLIPHANT, G. W. DATE: 1957-08
TITLE: AN APPLICATION OF SOME INDUSTRIAL ENGINEERING PRINCIPLES TO AN ELECTRICAL MAINTENANCE ORGANIZATION
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-1172 CLASS: U DRAWER: 10
CUSTODIAN: CF
COMMENT:

4-444 AUTHOR: ARMSTRONG, R. C. DATE: 1955-02-14
TITLE: MERCURY INVENTORY REQUIREMENTS FOR ALFAH-5 AND ALPHA-4 PLANTS. LETTER TO J. P. MURRAY (UCC) FROM R. C. ARMSTRONG (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: S DRAWER: 17
CUSTODIAN: CF
COMMENT: INVENTORY REQUIREMENTS

4-444 AUTHOR: MURRAY, J. P. DATE: 1955-03-15
TITLE: MERCURY INVENTORY REQUIREMENTS FOR ALFAH-5 AND ALPHA-4 PLANTS LETTER TO R. C. ARMSTRONG (AEC) FROM J. P. MURRAY (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: Y-AO-1189 CLASS: S DRAWER: 17
CUSTODIAN: CF
COMMENT: INVENTORY REQUIREMENTS

4-444 AUTHOR: BLOCH, E. J. DATE: 1955-08-25
TITLE: DELIVERY SCHEDULES FOR FLASKS, LETTER FROM E. J. BLOCH (AEC) TO W. S. FLOYD (OFFICE OF DEFENSE MOBILIZATION)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: S DRAWER: 17
CUSTODIAN: CF
COMMENT: SHIPMENTS

4-444 AUTHOR: SHANNON, S. S. DATE: 1955-10-4
TITLE: REVIEW OF THE MOBILIZATION BASE FOR MERCURY, LETTER TO OGDEN (OFFICE OF DEFENSE MOBILIZATION) FROM S. S. SHANNON (DEPT. OF DEF.
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: S DRAWER: 17
CUSTODIAN: CF
COMMENT: SHIPMENTS

- 444 AUTHOR: SHEPPARD, S. S. DATE: 1955-11-15
TITLE: POSSIBILITY OF EXPANDING SUPPLY OF MERCURY PLASKS TO OFFICE OF DEFENSE MOBILIZATION, LETTER TO E. J. BLOCH (AEC) FROM ODM.
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: S DRAWER: 17
CUSTODIAN: CP
COMMENT: PLASKS
- 444 AUTHOP: ARMSTRONG, J. C. DATE: 1955-11-16
TITLE: TRANSMITTAL OF PRELIMINARY AGENDA ON MERCURY CONFERENCE, LETTER FROM R. C. ARMSTRONG (AEC) TO J. P. MURRAY (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:
- 444 AUTHOR: SAPIRIE, S. R. DATE: 1955-12-15
TITLE: MERCURY AVAILABILITY FOR POSSIBLE ADP EXPANSION, LETTER TO C. E. CENTER (UCC) FROM S. R. SAFIRIE (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: S DRAWER: 17
CUSTODIAN: CF
COMMENT: AVAILABILITY
- 444 AUTHOP: ARMSTRONG, R. C. DATE: 1955-12-27
TITLE: SHIPMENTS OF MERCURY FOR ADP PROGRAM, LETTER TO J. P. MURRAY (UCC) FROM R. C. ARMSTRONG (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: S DRAWER: 17
CUSTODIAN: CF
COMMENT: SHIPMENTS
- 445 AUTHOP: ARMSTRONG, R. C. DATE: 1956-J2-02
TITLE: PROPOSAL SUBMITTED BY THE UNIVERSITY OF PITTSBURGH ON ABSORPTION OF MERCURY THROUGH THE INTACT HUMAN SKIN, LETTER FROM R. C.
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP
COMMENT: KAMMER OF UNIV OF PITTSBURGH TO BE CONTACTED TO PROVIDE EXPERT HELP ON PROBLEM OF SKIN ABSORPTION.
- 445 AUTHOR: SHOUE, C. S. DATE: 1956-02-02
TITLE: TOXICITY OF MERCURY - REPORT ON VISIT TO OAK RIDGE OF DRS. HAROLD HODGE AND THOMAS ELY, JANUARY 31, 1956, LETTER FROM C. S.
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP
COMMENT: PLANS BY UNIV, CP ROCHESTER TO STUDY EFFECTS OF MERCURY; COMMENTS ON VISIT TO HIGH-USE AREAS.

- 445 AUTHOR: ARMSTRONG, R. C. DATE: 1956-02-07
TITLE: TRANSMITTAL OF REPORT OF VISIT BY H. HODGE AND T. ELY, LETTER FROM R. C. ARMSTRONG (AEC) TO J. P. MURRAY (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
- CUSTODIAN: CF
COMMENT: PROPOSED STUDY OF TOXICITY OF MERCURY BY UNIV. OF ROCHESTER.
- 445 AUTHOP: SAPIRLE, S. R. DATE: 1956-02-08
TITLE: TOXICITY OF MERCURY, LETTER FROM S. R. SAPIRLE (AEC) TO C. E. CENTER (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
- CUSTODIAN: CP
COMMENT: UNIV. OF ROCHESTER PERSONNEL VISITED 9201-4 IN CONNECTION WITH PROPOSED STUDY OF MERCURY EXPOSURE.
- 445 AUTHOP: LAPPINCE AND GOOGIN DATE: 1956-02-28
TITLE: VISIT OF DR. KEHOE TO THE Y-12 PLANT, LETTER FROM LEO J. LAPRANCE AND J. H. GOOGIN TO J. P. MURRAY
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
- CUSTODIAN: CP
COMMENT: CONSULTANT SEES POTENTIALLY SERIOUS HEALTH PROBLEM IN BUILDINGS WHERE SOLVENT IS USED.
- 445 AUTHOP: APMSPTONG, R. C. DATE: 1956-04-12
TITLE: RECLASSIFICATION CP ADF MERCURY, LETTER TO J. P. MURRAY, (UCC) FROM R. C. ARMSTRONG
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: CP
COMMENT:
- 445 AUTHOR: SAPIRLE, S. R. DATE: 1956-04-23
TITLE: TOXICITY OF MERCURY, LETTER TO C. E. CENTER (UCC) FROM S. R. SAPIRLE (AEC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
- CUSTODIAN: CF
COMMENT: ROCHESTER UNIVERSITY WORK TO HELP ORO EVALUATE KIDNEY IRRITATION EVIDENCE IN 42 COLEX WORKERS.

1-445 AUTHOR: MURRAY, J. P. DATE: 1956-06-02
TITLE: ALPHA-5 SOLVENT DISTRIBUTION, LETTER TO R. C. ARMSTRONG (AEC) FROM J. P. MURRAY (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: Y-AO-1436 CLASS: S DRAWER: 17
CUSTODIAN: CP
COMMENT: ALPHA-5

1-445 AUTHOR: ARMSTRONG, R. C. DATE: 1956-06-21
TITLE: TRANSFER OF MERCURY FLASKS TO ANP PROJECT, LETTER TO J. P. MURRAY (UCC) FROM R. C. ARMSTRONG (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: ORO-79220 CLASS: S DRAWER: 17
CUSTODIAN: CP
COMMENT: SHIPMENTS

1-445 AUTHOR: ARMSTRONG, R. C. DATE: 1956-06-21
TITLE: SHIPMENT OF MERCURY TO ANOTHER GOVERNMENT PROJECT, LETTER FROM R. C. ARMSTRONG (AEC) TO J. P. MURRAY (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: ORO-79220 CLASS: S DRAWER: 17
CUSTODIAN: CP
COMMENT: AMOUNT OF SHIPMENT GIVEN IN FOUNDS AND FLASKS.

1-445 AUTHOR: MURRAY, J. P. DATE: 1956-07-02
TITLE: DISTRIBUTION OF SOLVENT IN ALPHA-5 PROJECT, LETTER FROM J. P. MURRAY (UCC) TO R. C. ARMSTRONG (AEC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: Y-AO-1436 CLASS: S DRAWER: 17
CUSTODIAN: CP
COMMENT: POUNDS IN ALPHA-4, -5, BETA-4, IN INVENTORY, AND IN MCTP.

1-445 AUTHOR: SAPIRIE, S. R. DATE: 1956-07-10
TITLE: MERCURY PROCUREMENT, LETTER TO C. E. CENTER (UCC) FROM S. R. SAPIRIE (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: ORO-79220 CLASS: S DRAWER: 17
CUSTODIAN: CP
COMMENT:

1-445 AUTHOR: SAPIRIE, S. R. DATE: 1956-07-10
TITLE: MERCURY PROCUREMENT, LETTER FROM S. R. SAPIRIE (AEC) TO C. E. CENTER (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: ORO-79220 CLASS: S DRAWER: 17
CUSTODIAN: CP
COMMENT: FLASKS DUE TO STOCKPILE; FLASKS TO BE PROCURED BY AEC.

- 1-449 AUTHOR: CAPFILEG, L. C. DATE: 1981
TITLE: MERCURY SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: CP
COMMENT: MATERIALS FROM THE BUREAU OF MINES MINERALS YEARBOOK
- 1-450 AUTHOR: BIRNFIN, B. F. DATE: 1960-10-18
TITLE: PURIFICATION OF MERCURY CONTAMINATED LITHIUM HYDROXIDE
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: RT-542 CLASS: U DRAWER: 10
CUSTODIAN:
COMMENT: MIT PRACTICE SCHOOL PROJECT - RECRYSTALLIZATION
- 1-450 AUTHOR: DRAKE, H. J. DATE: 1980
TITLE: MERCURY - A CHAPTER FROM MINERALS FACTS AND PROBLEMS
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: CF
COMMENT:
- 1-451 AUTHOR: GOLDWATER, L. J. DATE: 1971-05
TITLE: MERCURY IN THE ENVIRONMENT
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: CP
COMMENT: DOES MERCURY CONCENTRATIONS BY INDUSTRY ENDANGER ANIMALS & HUMAN BEINGS. SCIENTIFIC AMERICAN, VOL. 224, NO. 5.
- 1-452 AUTHOR: DATE: 1956-03
TITLE: HYGIENIC GUIDE SERIES ON MERCURY. ARTICLE FROM AMERICAN INDUSTRIAL HYGIENE ASSOCIATION
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: CF
COMMENT: RECOMMENDED MAXIMUM ATMOSPHERIC CONCENTRATIONS AND OTHER POTENTIAL HAZARDS
- 1-453 AUTHOR: DATE: 1949-01
TITLE: HEALTH PHYSICS PROGRESS REPORT FOR JAN, 1949
SUBJECT: MONTHLY REPORT, Y-12 PLANT HEALTH PHYSICS DIV.
REPORT NUM: Y-3339 CLASS: U DRAWER: 4
CUSTODIAN: CP
COMMENT:

- 1-458 AUTHOR: UCC DATE: 1971
TITLE: ENVIRONMENTAL MONITORING REPORT FOR THE OAK RIDGE AREA - CY 1971
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: CASE, J. M.
COMMENT: ANALYSIS OF WATER IN EAST FCRK POPLAR CREEK (TABLE 19) EPA STANDARDS.
- 1-458 AUTHOR: RUCKELSHAUS, WM. D. DATE: 1971-12-22
TITLE: SURVEY OF USAGE AND DISPOSAL OF MERCURY. LETTER FROM WILLIAM D. RUCKELSHAUS (EPA) TO W. F. PULKERSON (UCC)
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: PULKERSON'S EFFCRTS ENDORSED.
- 1-458 AUTHOR: CASE, J. M. DATE: 1972-02-01
TITLE: COMMENTS ON EPA PROPOSED NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS. LETTER FROM J. M. CASE (UCC) TO C. A. KEL
LEP (AEC) SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: EPA STANDARDS FOR MERCURY. MERCURY RELEASE LIMITS AT Y-12.
- 1-458 AUTHOR: TRAIN, RUSSELL E. DATE: 1972-02-09
TITLE: SURVEY OF USAGE AND DISPOSAL OF MERCURY. LETTER FROM RUSSELL E. TRAIN (EPA) TO W. F. PULKERSON (UCC)
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: PULKERSON'S EFFCRTS ENDORSED.
- 1-458 AUTHOR: TN DP PUB HEALTH DATE: 1972-02-11
TITLE: EMISSION REDUCTION PLANS FOR EMERGENCY EPISODES. LETTER FROM STATE OF TENN. TO S. R. SAPIRIE (AEC)
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: SPECIFIES REPORTING REQUIREMENTS.
- 1-458 AUTHOR: SAPIRIE, S. R. DATE: 1972-02-16
TITLE: EFFLUENT REDUCTION PROGRAM - PHASE II. LETTER FROM S. R. SAPIRIE (AEC) TO R. F. HIBBS (UCC)
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: CONTAMINATION OF ONSITE AND OFFSITE LAND AREAS. RADIONUCLIDES.

1-458 AUTHOR: HART, F. J. DATE: 1972-03-10
TITLE: TENNESSEE AIR POLLUTION EMISSION REDUCTION PLANS. LETTER FROM R. J. HART (AEC) TO R. F. HIBBS (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT:

1-458 AUTHOR: TN D PUB HEALTH DATE: 1972-03-14
TITLE: AIR POLLUTION CONTROL REGULATIONS, LETTER FROM STATE OF TENNESSEE TO S. R. SAPIRIE (AEC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: TENN. AIR POLLUTION CONTROL REGULATIONS.

1-458 AUTHOR: HART, F. J. DATE: 1972-03-24
TITLE: BUDGET - ENVIRONMENTAL DATA FOR FY-1974 LETTER FROM R. J. HART (AEC) TO R. F. HIBBS (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT:

1-458 AUTHOR: FAGGEORGE, W. B. DATE: 1972-04

TITLE: PCB, LETTER FROM MONSANTO INDUSTRIAL CHEMICALS CO. TO (NO ADDRESSEE)

SUBJECT: CORRESPONDENCE (EXTERNAL)

REPORT NUM: CLASS: U DRAWER: 17

CUSTODIAN: CASE, J. M.

COMMENT: IMPACT OF PCB POLLUTION (LETTER OF CAUTION RE ACCIDENTAL CONTAMINATION) FILE NOTATION OF FURTHER CORRESPONDENCE BETWEEN HART AND MONSANTO.

1-458 AUTHOR: HIBBS, R. F. DATE: 1972-05-11
TITLE: TENNESSEE AIR POLLUTION EMISSION REDUCTION PLANS. LETTER FROM R. F. HIBBS (UCC) TO R. J. HART (AEC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: CONTROL ACTIONS.

1-458 AUTHOR: CASE, J. M. DATE: 1972-05-24
TITLE: FY 1972 ANNUAL PROGRESS REPORT ON AIR AND WATER POLLUTION ABATEMENT PROJECTS. LETTER FROM J. M. CASE (UCC) TO R. D. HICKMAN (AEC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: POLLUTING DISCHARGE. REQUIREMENTS OF STANDARDS.

- 1-458 AUTHOR: FULKERSON, W. P. DATE: 1972-06-07
TITLE: SURVEY OF USAGE AND DISPOSAL OF MERCURY. LETTER FROM W. FULKERSON (ORNL) TO P. R. VANSTRUM (UCC)
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: COMMENT: CONDUCTED NATIONAL SURVEY. ENCLOSED BY TRAIN AND RUCKELSHAUS OF EPA.
- 1-458 AUTHOR: JORDAN, T. G. DATE: 1972-06-14
TITLE: SAFETY AND ENVIRONMENTAL PROTECTION, LETTER FROM R. G. JORDAN TO J. M. CASE ET AL
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: ESTABLISHMENT OF UCCND OFFICE OF SAFETY AND ENVIRONMENTAL PROTECTION. CHARTER. OBJECTIVES.
- 1-458 AUTHOR: FULKESEN, W. DATE: 1972-06-14
TITLE: QUESTIONNAIRE OF SURVEY ON THE USAGE AND DISPOSAL OF MERCURY BY VARIOUS AGENCIES AND INSTALLATIONS
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT:
- 1-458 AUTHOR: JORDAN, T. G. DATE: 1972-06-19
TITLE: MERCURY USAGE SURVEY, LETTER FROM R. G. JORDAN TO J. M. CASE ET AL.
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT:
- 1-458 AUTHOR: PRESIDENT, UCC DATE: 1972-06-30
TITLE: ESTABLISHMENT OF CONFORATE INFORMATION CONTROL CENTER, LETTER FROM UCC HEADQUARTERS TO EXECUTIVE LIST
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: CONFOPATE ENVIRONMENTAL INFORMATION COMMITTEE.
- 1-458 AUTHOR: HIBBS, K. P. DATE: 1972-07-03
TITLE: RADIOACTIVE EFFLUENT DATA REPORT, LETTER FROM R. P. HIBBS (UCC) TO R. J. HART (AEC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: USAEC LIQUID AND AIRBORNE RADICATIVE EFFLUENT DATA (CY 1971) FOR ORNL, ORGDP, Y12 AND PGDP.

1-458 AUTHOR: HART, R. J. DATE: 1972-07-28
TITLE: AEC TECHNICAL CONFERENCE ON POLLUTION CONTROL AND ABATEMENT AT AEC FACILITIES. LETTER FROM R. J. HART (AEC) TO R. F. HIBBS (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)

REPORT NUM: CLASS: U DRAWER: 17

CUSTODIAN: CASE, J. M.

COMMENT: AGENDA OF SPECIFIC ABATEMENT PROBLEMS AT AEC FACILITIES (OCT. 25, 26, 27, 1972).

1-458 AUTHOF: HICKMAN, H. D. DATE: 1972-08-22
TITLE: PROTECTION OF POTENTIAL SECURITY INFORMATION IN CERTAIN REPORTS. LETTER FROM H. D. HICKMAN (AEC) TO J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)

REPORT NUM: CLASS: U DRAWER: 17

CUSTODIAN: CASE, J. M.

COMMENT: DUAL RESPONSIBILITY OF GOOD SECURITY AND PROGRESSIVE ENVIRONMENTAL PROTECTION ACTION.

1-458 AUTHCR: TRAVIS, WILLIAM H. DATE: 1972-09-12
TITLE: 1972 ENVIRONMENTAL MANAGEMENT APPRAISAL ORGDP, Y12, ORNL LETTER FROM WILLIAM TRAVIS (AEC) TO R. G. JORDAN (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)

REPORT NUM: CLASS: U DRAWER: 17

CUSTODIAN: CASE, J. M.

COMMENT: LIST OF TOPICS TO BE COVERED IN APPRAISAL.

1-458 AUTHOF: JORDAN, R. G. DATE: 1972-09-13
TITLE: ANNUAL AEC ENVIRONMENTAL POLLUTION CONTROL APPRAISAL. LETTER FROM R. G. JORDAN TO J. M. CASE ET AL.
SUBJECT: CORRESPONDENCE (INTERPNL)

REPORT NUM: CLASS: U DRAWER: 17

CUSTODIAN: CASE, J. M.

COMMENT: SCHEDULE OF SUBJECTS FOR DISCUSSION OF POLLUTION CONTROL AT THREE PLANTS.

1-458 AUTHOF: VANSTRUM, P. R. DATE: 1972-09-20
TITLE: MERCURY QUESTIONNAIRE. LETTER FRM P. R. VANSTRUM TO WILLIAM FULKERSON (ORNL)
SUBJECT: CORRESPONDENCE (INTERNAL)

REPORT NUM: CLASS: U DRAWER: 17

CUSTODIAN: CASE, J. M.

COMMENT: USAGE AND DISPOSAL OF MERCURY SURVEY OF JULY 1972 FOR ORGDP, PADUCAH, Y12 AND ORNL (CY 1971). MERCURY LOST BY ORNL ISOTOPES DIV.

1-458 AUTHCR: CASE, J. M. DATE: 1972-09-28
TITLE: 1972 ENVIRONMENT MANAGEMENT APPRAISAL FOR ORNL, Y12, ORGDP, CRITIQUE SESSION IN JORDAN'S OFFICE
SUBJECT: CORRESPONDENCE (INTERNAL)

REPORT NUM: CLASS: U DRAWER: 17

CUSTODIAN: CASE, J. M.

COMMENT: HEXAVALENT CHROMIUM, EAST FCRK POPLAR CREEK. SLUDGE DISCHARGES, DISPOSAL OF WASTE OIL.

- 1-458 AUTHOR: HART, R. J. DATE: 1972-10-11
TITLE: EMISSION REDUCTION PLAN FOR AIR POLLUTION EPISODES, LETTER FROM R. J. HART (AEC) TO E. P. HIBBS (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: APPROVAL OF EMISSION REDUCTION PLAN BY TENN. DIV. OF AIR POLLUTION CONTROL.
- 1-458 AUTHOR: CASE, J. M. DATE: 1972-11-07
TITLE: UCCND ENVIRONMENTAL MONITORING AND PROTECTION, COMMITTEE MEETING MINUTES FOR OCT 27, 1972 FROM R. G. JORDAN TO J. M. CASE ET AL.
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: AEC SUGGESTIONS FOR IMPROVEMENTS. CONFIDENCE LIMITS ON VALUES PUBLISHED IN ENVMT MONITORING RPTS. AEC RESPONSE TO OAK RIDGE ON RADIOACTIVE RELEASE
- 1-458 AUTHOR: HIBBS, F. F. DATE: 1972-11-13
TITLE: EMISSION REDUCTION PLAN FOR AIR POLLUTION EPISODES, LETTER FROM R. P. HIBBS (UCC) TO R. J. HAET (AEC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: DETAILED IN-HOUSE PROCEDURES RELATIVE TO STATE OF TENN. AIR POLLUTION EPISODES.
- 1-458 AUTHOR: JORDAN, T. G. DATE: 1972-12-20
TITLE: MONITORING REPORT, LETTER FROM R. G. JORDAN TO J. M. CASE ET AL.
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: INTENTION TO REPORT POTENTIAL PROBLEM AREAS IN ENVIRONMENTAL POLLUTION ON MONTHLY BASIS TO ALERT MANAGEMENT.
- 1-459 AUTHOR: DATE: 1971
TITLE: CORRESPONDENCE ON ENVIRONMENTAL PROTECTION FOR 1971
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: RC
COMMENT: POLLUTION CONTROL
- 1-459 AUTHOR: JORDAN, T. G. DATE: 1971-04
TITLE: UCC-ND ENVIRONMENTAL COMMITTEE MEETING
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: RC
COMMENT:

1-459 AUTHOR: KELLER, C. A. DATE: 1971-04-05
TITLE: TENNESSEE AIR POLLUTION CONTROL REGULATIONS - LAND AREA CLASSIFICATION FOR ANDERSON COUNTY & A PORTION OF RCANE COUNTY, L.E.
.P. FROM C. A. KELLEF (AEC) TO P. R. VANSTRUM (UCC)
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: RC
COMMENT: ANDERSON & LOANE COUNTY CONTROL REGULATIONS

1-459 AUTHOR: JORDAN, T. G. DATE: 1971-04-29
TITLE: REVIEW OF LIQUID WASTE MANAGEMENT PRACTICES, LETTER FROM R. G. JORDAN TO P. R. VANSTRUM
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: RC
COMMENT:

1-459 AUTHOR: COPNELL, G. H. DATE: 1971-05-04
TITLE: TENNESSEE AIR POLLUTION CONTROL REGULATIONS, LETTER FROM J. H. COPNELL (TN PUBLIC HEALTH DEPT.) TO D. R. MCCAMMON (UCC)
SUBJECT:
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: RC
COMMENT: CONTROL REGULATIONS

1-459 AUTHOR: BILES, M. B. DATE: 1971-05-07
TITLE: EXTENSION OF THE REFUSE ACT OF 1899 TO REQUIRE PERMITS FOR LIQUID WASTE DISCHARGES FROM FEDERAL FACILITIES, LETTER TO AEC, F
OM M. B. BILES (AEC)
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: RC
COMMENT:

1-459 AUTHOR: CASE, J. H. DATE: 1971-05-10
TITLE: FY-1971 ANNUAL PROGRESS REPORT ON AIR AND WATER POLLUTION ABATEMENT PROJECTS, LETTER TO C. A. KELLER, (AEC), FROM J. H. CASE
(UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: RC
COMMENT:

1-459 AUTHOR: WILCOX, W. J. DATE: 1971-06-02
TITLE: WASTE MANAGEMENT AND POLLUTION CONTRL ERANCH, LETTER TO J. P. WING, (AEC), FROM W. J. WILCOX (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: RC
COMMENT: POLLUTION CCNTRCL

1-459 AUTHOR: AEC DATE: 1971-06-03
TITLE: APPLICATIONS FOR LIQUID WASTE DISCHARGE PERMITS FROM THE CORPS FOR ENGINEERS. LETTER TO MANAGERS OF AEC FIELD OFFICES, PROV
SUBJECT: CORRESPONDENCE, INTERNAL
REP/CRT NUM: CLASS: C DRAWER: 17
CUSTODIAN: PC
COMMENT:

1-459 AUTHOR: SAPIFIE, S. R. DATE: 1971-06-10
TITLE: APPLICATIONS FOR LIQUID WASTE DISCHARGE PERMITS FROM THE CORPS OF ENGINEERS. LETTER FROM S. R. SAPIFIE (AEC) TO R. F. HIBBS
(UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT:

1-459 AUTHOR: SAPIFIE, S. R. DATE: 1971-09-28
TITLE: WATER EFFLUENT DATA, LETTER FROM S. R. SAPIFIE (AEC) TO E. JENSEN (EPA)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: PC
COMMENT:

1-459 AUTHOR: CASE, J. M. DATE: 1971-12
TITLE: FABRICATION AND ASSEMBLY AREA ENVIRONMENTAL CONTROL REQUIREMENTS. LETTER FROM J. M. CASE (UCC) TO C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: RC
COMMENT:

1-459 AUTHOR: KELLER, C. A. DATE: 1971-12-06
TITLE: CUSHIONING MATERIAL FOR PACKAGING SHIPMENTS. LETTER FROM C. A. KELLER (AEC) TO J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: RC
COMMENT:

1-459 AUTHOR: HIBBS, P. F. DATE: 1971-12-07
TITLE: FUNDING FOR SELECTED ENVIRONMENTAL ACTIVITIES. LETTER FROM R. F. HIBBS (UCC) TO S. R. SAPIFIE (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: RC
COMMENT:

1-459 AUTHOR: WILCOX, W. J. DATE: 1971-12-17
TITLE: EXCHANGE OF DATA ON POLLUTION CONTROL, LETTER FROM WM. J. WILCOX, JR., TO R. A. WINKLE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: PC
COMMENT: TREATMENT OF WASTE EFFLUENT STREAMS

1-460 AUTHOR: HAFT, F. J. (DOE) DATE: 1974-06-20
TITLE: AUTHORIZATION FOR ACCESS TO Y-12 URINARY MERCURY BIOASSAY DATA, LETTER FROM R. J. HAFT (AEC) TO R. P. HIBBS (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: NIOSH ASKED FOR SCREENING OF 50 PERSONS FOR MERCURY EXPOSURE SYMPTOMS.

1-461 AUTHOR: CASE, J. M. DATE: 1974-12-27
TITLE: Y-12 URINARY MERCURY BIOASSAY DATA, LETTER FROM J. M. CASE TO P. R. VANSTRUM
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: 23 Y-12 PEOPLE EXPOSED TO MERCURY (1959-1974) WERE EXAMINED AND FOUND TO HAVE NO SYMPTOMS OR SIGNS OF MERCURIALISM. (ALSO 4-477)

1-462 AUTHOR: AEC DATE: 1967-06
TITLE: CONSTRUCTION PROJECT DATA SHEET - AIR AND WATER POLLUTION CONTROL - Y-12 PLANT
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HIBBS, R. P.
COMMENT: CONTROL LIQUID EFFLUENTS FROM LITHIUM FACILITIES.

1-463 AUTHOR: HAFT, R. J. DATE: 1973-09-19
TITLE: AUTHORIZATION FOR ACCESS TO Y-12 URINARY MERCURY BIOASSAY DATA, LETTER FROM R. J. HAFT (AEC) TO R. P. HIBBS (UCN)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: NIOSH CONSULTANT ZEB BELL REQUESTED COMPLETE PRINTOUT OF URINARY MERCURY LEVEL DATA FOR STUDY OF MERCURIALENTIS.

1-464 AUTHOR: HIBBS, R. P. DATE: 1964-01-08
TITLE: LAND BURIAL OF RADIOACTIVE WASTES, LETTER FROM R. P. HIBBS (UCC) TO C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HIBBS, R. P.
COMMENT: VOLUME OF RADIOACTIVE WASTE, NO. 1 BURIAL GROUND, PERIOD JULY 1, 1963 THROUGH DECEMBER 31, 1963.

1-464 AUTHOR: SAPIRIE, S. R. DATE: 1964-02-03
TITLE: WASTE WATER DISPOSAL PRACTICES, LETTER FROM S. R. SAPIRIE (AEC) TO C. E. LARSON (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HIBBS, R. P.
COMMENT: USPHS QUESTIONNAIRE. REPORT BY DEPT OF HEALTH, EDUCATION AND WELFARE: "WASTE WATER DISPOSAL PRACTICES AT FEDERAL INSTALLA-
TIONS."

1-464 AUTHOR: HIBBS, R. P. DATE: 1964-02-19
TITLE: WASTE WATER DISPOSAL PRACTICES, LETTER FROM R. P. HIBBS TO J. A. SWARTOUT (ORNL)
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HIBBS, R. P.
COMMENT: USPHS QUESTIONNAIRE ON Y12 PLANT WASTE WATER DISPOSAL PRACTICES.

1-464 AUTHOR: HIBBS, R. P. DATE: 1965-01-07
TITLE: LAND BURIAL OF RADIONACTIVE WASTES, LETTER FROM R.P. HIBBS (UCC) TO C.A. KELLER (AEC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HIBBS, R. P.
COMMENT: VOLUME OF RADIOACTIVE WASTE, NO. 1 BURIAL GROUND AT Y-12, PERIOD JULY 1, 1964 TO DEC. 31, 1964

1-464 AUTHOR: HIBBS, R. P. DATE: 1965-07-12
TITLE: LAND BURIAL OF RADIONACTIVE WASTES, LETTER FROM R.P. HIBBS (UCC) TO C.A. KELLER (AEC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HIBBS, R. P.
COMMENT: VOLUME OF RADIOACTIVE WASTE, NO. 1 BURIAL GROUND AT Y12, PERIOD JAN. 1, 1965 THROUGH JUNE 30, 1965.

1-464 AUTHOR: SAPIRIE, S. R. DATE: 1965-09-01
TITLE: INSPECTION BY USPHS OF UCC FACILITIES IN OAK RIDGE. REVIEW OF WASTE-WATER TREATMENT AND RADIOACTIVITY IN EFFLUENTS. LETTER TO
OM S.R. SAPIRIE (AEC) TO C.E. LARSON (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HIBBS, R. P.
COMMENT: REVIEW OF LIQUID WASTES TREATMENT AND CONTROL PRACTICES OF ALL AEC OAK RIDGE INSTALLATIONS BY DEPT OF HEW, CN SRPT. 14, 19
65.

1-464 AUTHOR: HIBBS, R. P. DATE: 1966-01-12
TITLE: LAND BURIAL OF RADIONATIVE WASTES, LETTER FROM R.P. HIBBS (UCC) TO C.A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HIBBS, R. P.
COMMENT: VOLUME OF RADIONATIVE WASTE, NO. 1 BURIAL FOUND AT Y-12 DURING PERIOD JULY 1, 1965 THROUGH DEC. 31, 1965.

- 1-464 AUTHOR: SAPIRIE, S. R. DATE: 1966-04-15
TITLE: WASTE WATER DISPOSAL PRACTICES. LETTER FROM S. R. SAPIRIE (AEC) TO C. E. LARSON (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HIBBS, R. F.
COMMENT: REPORT PREPARED AT AEC HEADQUARTERS ON ANSWERS TO QUESTIONS RAISED FROM REVIEW OF USPHS DATA. UCC OAK RIDGE SITES.
- 1-464 AUTHOR: LARSON, C. E. DATE: 1966-04-26
TITLE: WASTE WATER DISPOSAL PRACTICES. LETTER FROM C.E. LARSON (UCC) TO S.R. SAPIRIE (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HIBBS, R. F.
COMMENT: CORRECTION TO REPORT ON AEC WASTE WATER DISPOSAL PRACTICES RE SEWAGE DISCHARGE.
- 1-464 AUTHOR: HIBBS, R. F. DATE: 1966-07-05
TITLE: LAND BURIAL OF RADIONACTIVE WASTES. LETTER FROM R. F. HIBBS (UCC) TO C.A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HIBBS, R. F.
COMMENT: VOLUME OF RADIOACTIVE WASTE. NO.1 BURIAL GROUND AT Y-12 FOR PERIOD JAN. 1, 1966 THROUGH JUNE 30, 1966.
- 1-464 AUTHOR: HIBBS, R. F. DATE: 1967-01-09
TITLE: LAND BURIAL OF RADIONACTIVE WASTES. LETTER FROM R.F. HIBBS (UCC) TO C.A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: HIBBS, R. F.
COMMENT: VOLUME OF RADIONACTIVE WASTE. NO.1 BURIAL GROUND AT Y-12 FOR PERIOD JULY 1, 1966 THROUGH DEC. 31, 1966.
- 1-464 AUTHOR: CASE, J. M. DATE: 1967-07-14
TITLE: LAND BURIAL OF RADIONACTIVE WASTES. LETTER FROM J.M. CASE (UCC) TO C.A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: CASE, J. M.
COMMENT: VOLUME OF RADIONACTIVE WASTE. NO.1 BURIAL FOUND AT Y-12 FOR PERIOD JAN. 1, 1967 THROUGH JUNE 30, 1967.
- 1-464 AUTHOR: CASE, J. M. DATE: 1968-01-05
TITLE: LAND BURIAL OF RADIONACTIVE WASTES. LETTER FROM J.M. CASE (UCC) TO C.A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: CASE, J. M.
COMMENT: VOLUME OF RADIONACTIVE WASTE. NO.1 BURIAL GROUND AT Y-12 FOR PERIOD JULY 1, 1967 THROUGH DEC. 31, 1967.

- 1-464 AUTHOR: CASE, J. M. DATE: 1968-08-06
TITLE: LAND BUFFALO OF RADIONACTIVE WASTES. LETTER FROM J.M. CASE (UCC) TO JOSEPH LENHARD AND HOWARD HEACKER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: VOLUME OF RADIONACTIVE WASTE, NO. 1 BURIAL GROUND AT Y-12 FOR PERIOD JAN. 1, 1968 THROUGH JUNE 30, 1968.
- 1-464 AUTHOR: CASE, J. M. DATE: 1969-01-08
TITLE: LAND BURIAL OF RADIONACTIVE WASTES, LETTER FROM J.M. CASE (UCC) TO JOSEPH A. LENHARD AND HOWARD HEACKER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: VOLUME OF RADIONACTIVE WASTE, NO. 1 BURIAL GROUND AT Y-12 DURING PERIOD JULY 1, 1968 THROUGH DEC. 31, 1968
- 1-465 AUTHOR: SUBJECT: MERCURY URINE RESULTS 1974 - 1983 DATE: 1974 - 1983
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN:
COMMENT:
- 1-465 AUTHOR: SUBJECT: MERCURY URINALYSIS - RESULTS, 1979, 1980, 1981 1982, 1983 DATE: 1979-1983
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN: CP
COMMENT: REPORTS GIVING PER LITER FOR EMPLOYEES MONITORED.
- 1-467 AUTHOR: SUBJECT: SOLVENT CONTAMINATION (TABLES) DATE: 1955
REPORT NUM: CLASS: C DRAWER: 13
CUSTODIAN: CF
COMMENT: URINE EXCRETION AVERAGES.
- 1-467 AUTHOR: SUBJECT: MERCURY URINE CONTROLS, 1971 DATE: 1971
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN: CP
COMMENT: LISTS OF PERSONNEL BEING MONITORED

1-467 AUTHOR: DATE: 1974
TITLE: URINARY PERSONNEL - MERCURY, 1974
SUBJECT: HEALTH RECORDS CLASS: U DRAWER: 13
REPORT NUM: CUSTODIAN: CF
COMMENT: LISTS OF EMPLOYEES BEING MCNITCRED.

1-467 AUTHOR: DATE: 1981
TITLE: PERSONNEL MONITORING
SUBJECT: HEALTH RECORDS CLASS: U DRAWER: 13
REPORT NUM: CUSTODIAN: CF
COMMENT: MERCURY URINALYSIS PROGRAM

1-468 AUTHOR: DATE: 1965-01
TITLE: RECLASSIFICATION OF ALPHA-5 FACILITIES
SUBJECT: ACCOUNTING AND BUDGET DATA CLASS: U DRAWER: 5
REPORT NUM: CUSTODIAN: KENDRICK, J. M.
COMMENT: INCLUDES PLANS OF 9201-5

1-469 AUTHOR: DATE: 1960-08
TITLE: ALPHA-5 STRIPPING COMPLETION FLOOR PLANS
SUBJECT: ACCOUNTING AND BUDGET DATA CLASS: U DRAWER: 5
REPORT NUM: CUSTODIAN: KENDRICK, J. M.
COMMENT:

1-470 AUTHOR: DATE: 1978-1983
TITLE: MERCURY URINE SCHEDULES, 1978-1983
SUBJECT: HEALTH RECORDS CLASS: U DRAWER: 13
REPORT NUM: CUSTODIAN: CF
COMMENT: PARTICIPATION SCHEDULE FOR MERCURY URINALYSIS AND MEDICAL CHECK PROGRAMS

1-471 AUTHOR: DATE: 1965-01
TITLE: EQUIPMENT LISTING
SUBJECT: ACCOUNTING AND BUDGET DATA CLASS: U DRAWER: 5
REPORT NUM: CUSTODIAN: KENDRICK, J. M.
COMMENT:

1-471 AUTHOR: DATE: 1965
TITLE: EXCESS LIST LEDGER FOR 9201-5
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT:

1-472 AUTHOR: DATE: 1966-01
TITLE: ALPHA 5 EQUIPMENT AND MATERIAL ITEM LISTING
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT:

1-473 AUTHOR: DATE: 1966-01
TITLE: EQUIPMENT STRIPPING FROM 9201-5 - ACCCOUNTING DATA
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT:

1-474 AUTHOR: DATE: 1965-12
TITLE: STRIPPING OF COLEX EQUIPMENT AND COST ANALYSIS FOR 9201-5
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT: 3 FOLDERS - SAME SUBJECT

1-475 AUTHOR: DATE: 1965-12
TITLE: SUMMARY COST ANALYSIS PROFIT AND LOSS STATEMENT
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT:

1-476 AUTHOR: DATE: 1966-01
TITLE: BUILDING 9201-5 STRIPPING PROGRESS REPORTS
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT:

- 1-477 AUTHOR: KELLER, CHARLES A. DATE: 1971-10-15
TITLE: PARTICIPATION IN ENGINEERING FOUNDATION CONFERENCE. LETTER FROM CHARLES A. KELLER (AEC) TO J. H. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: CASE, J. H.
COMMENT: H. T. KITE, UNCLASSIFIED PAPER ON CONTROL OF MERCURY VAPOR.
- 1-477 AUTHOR: CLAFKIN, W. E. DATE: 1971-10-5
TITLE: PARTICIPATION IN ENGINEERING FOUNDATION CONFERENCE ON JAN. 9-14, 1972, LETTER FROM W. E. CLARK (ORNL) TO H. T. KITE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: CASE, J. H.
COMMENT: MERCURY IN THE INDUSTRIAL ENVIRONMENT
- 1-477 AUTHOR: HIBBS, R. F. DATE: 1972, NOVEMBER 8
TITLE: HEALTH AND SAFETY DATA RELATED TO MERCURY. LETTER FROM R. F. HIBBS (UCC) TO R. J. HART (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: CASE, J. H.
COMMENT: URINALYSIS DATA ON EMPLOYEES
- 1-477 AUTHOR: FOSS, DONALD M. DATE: 1972-J6-27
TITLE: DECLASSIFICATION OF HEALTH AND SAFETY DATA RELATED TO MERCURY EXPOSURES IN Y-12. LETTER FROM D. M. ROSS (AEC) TO C. F. KNESSE (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: CASE, J. H.
COMMENT: HEALTH AND SAFETY DATA ON MERCURY WORKERS IN Y12 DURING LATE 50'S AND EARLY 60'S.
- 1-477 AUTHOR: NEEF, MELVIN E. DATE: 1972-06-30
TITLE: DECLASSIFICATION OF HEALTH AND SAFETY DATA RELATED TO MERCURY EXPOSURES IN Y-12. LETTER FROM MELVIN E. NEEF (AEC) TO L. R. J. CHENER, CLASSIFICATION OFFICER, O.R.
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: CASE, J. H.
COMMENT: NEWELL BOLTON (ORNL). TABERSHAW AND COOPER. RELEASE OF DATA.
- 1-477 AUTHOR: HART, R. J. DATE: 1972-J7-18
TITLE: DECLASSIFICATION OF HEALTH AND SAFETY DATA RELATED TO MERCURY. LETTER FROM R. J. HART (AEC) TO E. F. HIBBS (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
- CUSTODIAN: CASE, J. H.
COMMENT: NIOSH, NEWELL BOLTON (ORNL). RELEASE OF DATA.

- 1-477 AUTHCR: CASE, J. H. DATE: 1972-07-20
TITLE: Y-12 REPORT OF CONTROL MERCURY VAPOR, LETTER FROM J. H. CASE (UCC) TO H. D. HICKMAN (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. H.
COMMENT: PROPOSED REPORT FOR ISSUE. (H. T. KITE, H. F. SCHIVENN COORDINATED DETAILS WITH JORDAN)
- 1-477 AUTHOR: HICKMAN, H. D. DATE: 1972-10-31
TITLE: Y-12 REPORT OF CONTROL OF MERCURY VAPOR, LETTER FROM H. D. HICKMAN (AEC) TO J. H. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. H.
COMMENT: DISCUSSION WITH G. W. MITCHELL CONCERNING PUBLICATION OF SUBJECT REPORT FOR DISTRIBUTION UNDER TID-4500.
- 1-477 AUTHOR: TANNER, P. A. DATE: 1973-10-09
TITLE: AUTHORIZATION FOR ACCESS TO Y-12 URINARY MERCURY BIOASSAY DATA, LETTER FROM R. A. TANNER TO J. H. CASE
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. H.
COMMENT: Y12 EMPLOYEES MERCURY BIOASSAY DATA FOR PERIOD 1953 TO 1966.
- 1-477 AUTHOR: MCLENDON, J. D. DATE: 1973-11-09
TITLE: URINARY MERCURY BIOASSAY DATA, LETTER FROM J. D. MCLENDON TO G. WILSON HORDE
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. H.
COMMENT: MERCURY URINARY DATA - CODING SYSTEM, MEDICAL RECORDS.
- 1-477 AUTHOR: HIBBS, R. F. DATE: 1973-12-26
TITLE: MERCURY BIOASSAY DATA, LETTER FROM R. F. HIBBS (UCC) TO R. J. HART (AEC)
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. H.
COMMENT: Y12 URINARY MERCURY BIOASSAY DATA.
- 1-477 AUTHOR: BRADSHAW, M. R. DATE: 1974-05-23
TITLE: MERCURY, MINUTES OF MEETING ON MAY 23, 1974, Y-12 AND AEC ATTENDEES
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. H.
COMMENT: MERCURY STORED IN BLDG 9720-6. LEAKING FLASKS.

- 1-477 AUTHCP: HART, F. J. DATE: 1974-06-20
TITLE: AUTHORIZATION FOR ACCESS TO Y12 URINARY MERCURY BIOASSAY DATA, LETTER FROM R. J. HART (AEC) TO R. P. HIBBS (UCC)
SUBJECT: CORRESPONDENCE (LETTER)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: MEDICAL HISTORIES. SPECIAL DIAGNOSTIC TESTS.
- 1-477 AUTHOR: HICKMAN, H. D. DATE: 1975-03-05
TITLE: REFLASKING OF 2,276 LEAKING FLASKS OF GSA MERCURY AT Y12, LETTER FROM H. D. HICKMAN TO J. M. CASE
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: PROCEDURES. COSTS. P-31-R2
- 1-477 AUTHOR: HICKMAN, H. D. DATE: 1975-04-04
TITLE: REMOVAL OF MERCURY FROM PROCESS EQUIPMENT IN BLDG 9201-4, LETTER FROM H. D. HICKMAN TO J. M. CASE
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT:
- 1-477 AUTHCP: HICKMAN, H. D. DATE: 1975-05-01
TITLE: POSSIBLE SALE OF MERCURY, LETTER PRCM H. D. HICKMAN TO J. M. CASE
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: POSSIBLE SALE OF ADDITIONAL 10,000 TO 15,000 PLASKS FROM Y12 INVENTORY.
- 1-477 AUTHOR: CASE, J. M. DATE: 1975-08-05
TITLE: DISPOSAL OF MERCURY AND EQUIPMENT - BLDG 9201-4, LETTER FROM J. M. CASE TO H. D. HICKMAN
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: SUMMARY OF PREVIOUS MERCURY SPILL IN 9201-5. CURRENT ASSESSMENT OF PROBLEMS RELATED TO CONTINUED STORAGE OF MERCURY IN 9201-4. (ALSO 1-760)
- 1-477 AUTHCP: HART, F. J. DATE: 1976-03-17
TITLE: AUTHORIZATION TO FLASK THE MERCURY IN Y12 ALPHA 4, LETTER FROM R. J. HART TO R. P. HIBBS
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: LITHIUM ISOTOPE SEPARATION FACILITY. MERCURY STORAGE. (ALSO M-393, -422, -783)

- 1-477 AUTHOR: ANDERSON, J. S. DATE: 1976-05-28
TITLE: SURVEY OF MERCURY PLASKS AND CRATES, LETTER FROM J. S. ANDERSON TO R. D. WILLIAMS
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: USED MERCURY FLASKS AND CRATES. POSSIBLE MEANS OF DISPOSAL. PHASE III STRIPPING OPERATION. Y5-2842 EQUIPMENT SPEC. (ALSO M-346, -760)
- 1-477 AUTHOR: HICKMAN, H. D. DATE: 1976-06-14
TITLE: GSA REQUEST REGARDING MERCURY. LETTER FROM H. D. HICKMAN (ERDA) TO J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: GJA ENVIRONMENTAL ASSESSMENT EFFORT. (ALSO M-391, -760)
- 1-477 AUTHOR: CASE, J. M. DATE: 1976-06-30
TITLE: GSA REQUEST REGARDING MERCURY. LETTER FROM J. M. CASE (UCC) TO H. D. HICKMAN (EPDA)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: MERCURY STOAGE PROCEDURES. PREVENTION OF MERCURY RELEASE THROUGH CONTAMINATED WATER. (ALSO M-422, -760)
- 1-477 AUTHOR: NAZIER, J. M. DATE: 1977-05-05
TITLE: ESTIMATED MERCURY LOSSES IN CREEK WATERS 1955 THROUGH 1975. LETTER FROM J. M. NAZIER TO D. W. SMITH
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: (ALSO M-760)
- 1-477 AUTHOR: CASE, J. M. DATE: 1977-06-09
TITLE: MERCURY INVENTORY AT Y12 PLANT 1950 THFOUGH 1977. LETTER FROM J. M. CASE TO H. D. HICKMAN
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: YAD-428 CLASS: S DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: SOLVENT LOSSES THROUGH VENTILATION EXHAUST SYSTEMS, BLDG. 9201-5. ESTIMATED MERCURY LOSSES IN CREEK WATERS 1955 THROUGH 1975.
- 1-478 AUTHOR: USAEC DATE: 1965
TITLE: USAEC REPORT CP INVESTIGATING COMMITTEE LOSS OF SPECIAL NUCLEAR MATERIAL AT Y-12 PLANT ON JANUARY 15, 1965
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: ORO-125208, PART 2 CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: DESCRIPTION OF LOSS AND SUBSEQUENT SALVAGE OPERATIONS

- 1-478 AUTHOR: USAEC DATE: 1965
TITLE: USAEC REPORT OF INVESTIGATING COMMITTEE LOSS OF SPECIAL NUCLEAR MATERIAL AT Y-12 PLANT ON JANUARY 15, 1965
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: ORC-125208 CLASS: S DRAWER: 17
CUSTODIAN: CP
COMMENT: DESCRIPTION OF LOSS AND SUBSEQUENT SALVAGE OPERATIONS
- 1-478 AUTHOR: SAPIRIE, S. R. DATE: 1966-03-30
TITLE: COMMITTEE TO INVESTIGATE APPARENT LOSS OF MERCURY AT THE Y-12 PLANT - MARCH 28, 1966. LETTER FROM S. R. SAPIRIE (AEC) TO COMITTEE MEMBERS
SUBJECT: CORRESPONDENCE, EXTERNAL CLASS: U DRAFTER: 17
REPORT NUM: CP
CUSTODIAN: CP
COMMENT: GROUP TO PRESENT RECOMMENDATIONS TO REDUCE PROBABILITY OF ACCIDENTS.
- 1-479 AUTHOR: GRIFFITH, W. L. DATE: 1964-04-13
TITLE: BUILDING 9201-5 STRIPPING AND STANDBY CONSIDERATIONS, LETTER FROM W. L. GRIFFITH TO J. J. CASE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: Y-KH-44 CLASS: S DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: PLANS TO DISPOSE OF SOLVENT
- 1-479 AUTHOR: KELLEY, C. A. DATE: 1964-09-11
TITLE: ABANDONMENT OF ALPHA-5 FACILITIES AT OAK RIDGE, LETTER FROM C. A. KELLER (AEC) TO R. P. HIBBS (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CP
CUSTODIAN: CASE, J. M.
COMMENT: AUTHORIZATION TO REMOVE EQUIPMENT FROM STANDBY STATUS.
- 1-479 AUTHOR: HIBBS, R. P. DATE: 1964-11-12
TITLE: ABANDONMENT OF ALPHA-5 FACILITIES AT OAK RIDGE, LETTER FROM R. P. HIBBS (UCC) TO C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CP
CUSTODIAN: CASE, J. M.
COMMENT: SCHEDULE FOR MERCURY BOTTLING GIVEN.
- 1-479 AUTHOR: KELLER, C. A. DATE: 1965-03-17
TITLE: STRIPPING OF ALPHA-5 EQUIPMENT, LETTER FROM C. A. KELLER (AEC) TO R. P. HIBBS (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CP
CUSTODIAN: CASE, J. M.
COMMENT: AUTHORIZATION BASED ON ASSUMPTION USEFUL APPLICATIONS OF EQUIPMENT WILL BE SOUGHT.

1-479 AUTHOR: HIBBS, P. P. DATE: 1965-05-07
TITLE: DISPOSAL OF ALPHA-5 EQUIPMENT. LETTER FROM R. P. HIBBS (UCC) TO C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: REVIEWS CLASSIFICATION AND SECURITY ASPECTS OF DISPOSAL.

1-479 AUTHOR: JENNINGS, D. A. DATE: 1965-06-04
TITLE: ALPHA 5 STRIPPING, LETTER FROM D. A. JENNINGS TO J. W. EBERT
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: STRIPPING STARTED MARCH 29, 1965. (ALSO M-392)

1-479 AUTHOR: HIBBS, P. P. DATE: 1965-07-19
TITLE: DISPOSAL OF ALPHA 5 EQUIPMENT. LETTER FROM R. P. HIBBS (UCC) TO C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: SECURITY ASPECTS OF EQUIPMENT DISPOSED.

1-479 AUTHOR: KELLER, C. A. DATE: 1965-08-19
TITLE: DISPOSAL OF ALPHA-5 EQUIPMENT. LETTER FROM C. A. KELLER (AEC) TO R. P. HIBBS (UCC)
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: AUTHORIZATION TO DISPOSE OF ALPHA-5 EQUIPMENT.

1-479 AUTHOR: SAPIRIE, S. R. DATE: 1966-03-04
TITLE: 3 RECLASSIFICATION OF PLANT AND EQUIPMENT AS EXCESS. LETTER FROM S. R. SAPIRIE (AEC) TO C. E. LARSON (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: ALPHA 5 FACILITY RECLASSIFIED.

1-479 AUTHOR: HIBBS, P. P. DATE: 1966-04-26
TITLE: REQUEST FOR MODIFICATION, FORM OR-638, WORK ORDER S-1921, STRIP COLEX EQUIPMENT, 9201-5, LETTER FROM R. P. HIBBS (UCC) TO C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: STRIPPING OPERATION TO CEASE DURING SUMMER.

- 4-489 AUTHOR: JORDAN, R. G. DATE: 1962-09-27
TITLE: PROGRAM COST CHANGES RESULTING FROM PROPOSED ALPHA-4 SHUTDOWN, LETTER FROM R. G. JORDAN (UCC) TO C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CASE, J. M.
COMMENT: GIVES COST ESTIMATE FOR BOTTLING MERCURY AND REMOVAL OF EQUIPMENT.
- 4-480 AUTHOR: HIBBS, F. P. DATE: 1963-01-07
TITLE: POTASSIUM ISOTOPES SEPARATION TESTS, LETTER FROM R. P. HIBBS (UCC) TO C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: HIBBS, F. P.
COMMENT: PROPOSES INVESTIGATION OF POTASSIUM HYDROXIDE-POTASSIUM SYSTEM IN CONNECTION WITH POTASSIUM SEPARATION COST.
- 4-480 AUTHOR: KELLER, C. A. DATE: 1965-06-04
TITLE: ALPHA-4 OPERATION STUDY, LETTER FROM C. A. KELLER (AEC) TO R. P. HIBBS (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: HIBBS, F. P.
COMMENT: REQUEST FOR OPERATIONAL DATA AT VARIOUS FRACTIONS OF CAPACITY TO PROVIDE INFORMATION ON MERCURY INVENTORY AND RESERVE REQUIREMENTS.
- 4-480 AUTHOR: HIBBS, R. F. DATE: 1965-06-29
TITLE: ALPHA-4 OPERATION STUDY, LETTER FROM R. F. HIBBS (UCC) TO C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: Y-AA-391 CLASS: S DRAWER: 17
CUSTODIAN: HIBBS, R. F.
COMMENT: OPERATIONAL DATA AT VARIOUS FRACTIONS OF CAPACITY WITH MERCURY INVENTORY REQUIRED FOR EACH.
- 4-480 AUTHOR: KELLER, C. A. DATE: 1966-04-11
TITLE: ALPHA-4 PLANT OPERATIONS, LETTER FROM C. A. KELLER (AEC) TO R. F. HIBBS (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: ORO-129341 CLASS: S DRAWER: 17
CUSTODIAN: HIBBS, R. F.
COMMENT: PLANS FOR ALPHA-4 PLANT OPERATIONS AFFECT AEC'S DECISION TO RELEASE FLASKS OF MERCURY TO GSA.
- 4-480 AUTHOR: HIBBS, R. F. DATE: 1966-04-25
TITLE: ALPHA-4 PLANT OPERATIONS, LETTER FROM R. F. HIBBS (UCC) TO C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: Y-AA-426 CLASS: S DRAWER: 17
CUSTODIAN: HIBBS, R. F.
COMMENT: EFFECT OF REQUIREMENTS ON LITHIUM PRODUCTION. INCLUDES MERCURY REQUIREMENTS.

- 1-480 AUTHOR: KELLER, C. A. DATE: 1968-12-19
TITLE: USES OF LI-7, LETTER FROM C. A. KELLEFF (AEC) TO J. H. CASE (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. H.
COMMENT: ASKS FOR INFORMATION ON LITHIUM SEPARATION IN CONNECTION WITH ECONOMIC EVALUATIONS OF MOLTEN SALT REACTOR
- 1-481 AUTHOR: VANSTROM, P. R. DATE: 1969-09-05
TITLE: STUDY OF MERCURY INVENTORY REQUIREMENTS. LETTER FROM P. R. VANSTRUM (UCC) TO C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: OCC-ND-87 CLASS: S DRAWER: 17
CUSTODIAN: CASE, J. H.
COMMENT: QUESTION OF HOW MUCH MERCURY SHOULD BE RETAINED AT Y-12.
- 1-482 AUTHOR: KELLER, C. A. DATE: 1969-09-30
TITLE: MERCURY TO BE TRANSFERRED TO GSA FOR DISPOSAL. LETTER FROM C. A. KELLER (AEC) TO J. H. CASE (UCC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CASE, J. H.
COMMENT: 15,000 FLASKS OF MERCURY IN PROCESS SYSTEM TO BE TRANSFERRED TO GSA. (ALSO M-384)
- 1-482 AUTHOR: WEST, C. M. DATE: 1958 THRU 1959
TITLE: SURFACE WATER SAMPLING 11-11-58 THRU 1-14-59
SUBJECT: HEALTH RECORDS
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT:
- 1-482 AUTHOR: RADIATION SAFETY DEPT DATE: 1959-01-14
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 2090-1H-4 CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT: SURFACE WATER SAMPLING JANUARY, 1958 - DECEMBER, 1958.
- 1-483 AUTHOR: DATE: 1957-01
TITLE: ALLOY DIVISION, WEEKLY PROGRESS REPORT FOR JAN, 1957
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPCPT NUM: Y-F4J-61 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

1-483 AUTHOR: DATE: 1957-02
TITLE: ALLOY DIVISION, WEEKLY PROGRESS REPORT FOR FEB., 1957
SUBJECT: MONTHLY PEPCT, ALLOY DIV.
REPORT NUM: Y-P40-62 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

1-483 AUTHOR: DATE: 1957-03
TITLE: ALLOY DIVISION, WEEKLY PROGRESS REPORT FOR MARCH, 1957
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-P40-67 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

1-483 AUTHOR: DATE: 1957-04
TITLE: ALLOY DIVISION, WEEKLY PROGRESS REPORT FOR APRIL, 1957
SUBJECT: MONTHLY REPCFT, ALLOY DIV.
REPORT NUM: Y-P40-68 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

1-483 AUTHOR: DATE: 1957-05
TITLE: ALLOY DIVISION, WEEKLY PROGRESS REPORT FOR MAY, 1957
SUBJECT: MONTHLY REFCFT, ALLOY DIV.
REPORT NUM: Y-P40-69 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

1-483 AUTHOR: DATE: 1957-06
TITLE: ALLOY DIVISION, WEEKLY PROGRESS REPORT FOR JUNE, 1957
SUBJECT: MONTHLY REPCFT, ALLOY DIV.
REPORT NUM: Y-P40-73 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

1-493 AUTHOR: DATE: 1957-07
TITLE: ALLOY DIVISION, WEEKLY PROGRESS REPORT FOR JULY, 1957
SUBJECT: MONTHLY REFCFT, ALLOY DIV.
REPORT NUM: Y-P40-74 CLASS: S DRAWER: 4
CUSTODIAN: BC
COMMENT:

Y-483 AUTHOR: DATE: 1957-08
TITLE: ALLOY DIVISION, WEEKLY PROGRESS REPORT FOR AUG, 1957
SUBJECT: MONTHLY REPCRT, ALLOY DIV.
REPORT NUM: Y-F40-76 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

Y-483 AUTHOR: DATE: 1957-09
TITLE: ALLOY DIVISION, WEEKLY PROGRESS REPORT FOR SEPT, 1957
SUBJECT: MONTHLY REPCRT, ALLOY DIV.
REPORT NUM: Y-F40-79 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

Y-483 AUTHOR: DATE: 1957-10
TITLE: ALLOY DIVISION, WEEKLY PROGRESS REPORT FOR OCT, 1957
SUBJECT: MONTHLY REPCRT, ALLOY DIV.
REPORT NUM: Y-F40-80 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

Y-483 AUTHOR: DATE: 1957-11
TITLE: ALLOY DIVISION, WEEKLY PROGRESS REPORT FOR NOV, 1957
SUBJECT: MONTHLY REPCRT, ALLOY DIV.
REPORT NUM: Y-F40-83 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

Y-483 AUTHOR: DATE: 1957-12
TITLE: ALLOY DIVISION, WEEKLY PROGRESS REPORT FOR DEC, 1957
SUBJECT: MONTHLY REPCPT, ALLOY DIV.
REPORT NUM: Y-F40-85 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

Y-484 AUTHOR: ALLOY DIVISION DATE: 1954
TITLE: MULTI-COLUMN TEST (MCF) AND PUMP TEST FACILITY (PTF) PROCEDURE
SUBJECT: TECHNICAL REPORTS
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT: STANDARD OPERATING PROCEDURE.

1-485 AUTHOR: DATE: 1957-01
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR JAN., 1957
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-64 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

1-485 AUTHOR: DATE: 1957-02
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR FEB., 1957
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-65 CLASS: S DRAWER: 4
CUSTODIAN: FC
COMMENT:

1-485 AUTHOR: DATE: 1957-04
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR APRIL 1957
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-71 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

1-485 AUTHOR: DATE: 1957-04
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR APRIL 1957
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-78 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

1-485 AUTHOR: DATE: 1957-05
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR MAY, 1957
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-72 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

1-485 AUTHOR: DATE: 1957-06
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR JUNE, 1957
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-75 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

Y-485 AUTHOR: DATE: 1957-07
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FCR JULY, 1957
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-77 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

Y-485 AUTHOR: DATE: 1957-08
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR AUG., 1957
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-78 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

Y-495 AUTHOR: DATE: 1957-09
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR SEPT., 1957
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-81 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

Y-485 AUTHOR: DATE: 1957-10
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR OCT., 1957
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-82 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

Y-485 AUTHOR: DATE: 1957-11
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FCR NOV., 1957
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-84 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

Y-485 AUTHOR: DATE: 1957-12
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR DEC., 1957
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-86 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

1-485 AUTHOR: DATE: 1958-03
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR MARCH, 1957
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-70 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

1-486 AUTHOR: DATE: 1958-01
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR JAN 1958
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-88 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-486 AUTHOR: DATE: 1958-02
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR FEB, 1958
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-61 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-486 AUTHOR: DATE: 1958-03
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR MARCH, 1958
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-92 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-486 AUTHOR: DATE: 1958-04
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR APRIL, 1958
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-93 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-486 AUTHOR: DATE: 1958-05
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR MAY, 1958
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-95 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-486 AUTHOR: DATE: 1958-06
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR JUNE, 1958
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-98 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-486 AUTHOR: DATE: 1958-07
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR JULY, 1958
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-100 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-486 AUTHOR: DATE: 1958-08
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR AUG., 1958
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-104 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-486 AUTHOR: DATE: 1958-09
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR SEPT., 1958
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-107 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-486 AUTHOR: DATE: 1958-10
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR OCT., 1958
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-110 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-486 AUTHOR: DATE: 1958-11
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR NOV., 1958
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-112 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-486 AUTHOR: KAMMER, A. G. DATE: 1959-01
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FCP DEC, 1958
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: Y-F40-114 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

1-487 AUTHOR: KAMMER, A. G. DATE: 1954-10-06
TITLE: PROVISION OF CLOTHING TO WORKERS POTENTIALLY EXPOSED TO MERCURY. LETTER FROM A. G. KAMMER TO J. R. MURRAY
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: PROPOSAL FOR STUDY OF PART PLAYED BY CLOTHING IN PROTECTION OF WORKERS.

1-487 AUTHOR: LITTLE, J. C. DATE: 1955-11-21
TITLE: MERCURY HAZARD COMMITTEE MEETING, NOVEMBER 21, 1955; REPORT BY J. C. LITTLE
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP
COMMENT: INCREASED VENTILATION RATE

1-487 AUTHOR: WATERS, J. L. DATE: 1955-11-30
TITLE: SOLVENT HAZARD COMMITTEE MEETING NO. 1, LETTER FROM J. L. WATERS TO E. C. ELLIS
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CF
COMMENT: COMMITTEE MEMBERS NAMED.

1-487 AUTHOR: WATERS, J. L. DATE: 1955-12-05
TITLE: SOLVENT HAZARD COMMITTEE MEETING NO. 2, NOVEMBER 28, 1955; LETTER FROM J. L. WATERS TO E. C. ELLIS
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP
COMMENT: PERSONNEL SHOWERS; CONTROL OF SOLVENT LEAKS

1-487 AUTHOR: WATERS, J. L. DATE: 1955-12-07
TITLE: SOLVENT HAZARD COMMITTEE MEETING NO. 3, DECEMBER 5, 1955; LETTER FROM J. L. WATERS TO L. E. BUEKHART
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP
COMMENT: GIVES ENGINEERING SCHEDULE OF DESIGN AND INVESTIGATION.

Y-487 AUTHOR: WATERS, J. L. DATE: 1955-12-16
TITLE: SOLVENT HAZARDS COMMITTEE MTG. NO. 4, DECEMBER 12, 1955; LETTER FROM J. L. WATERS TO L. E. BURKHART
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP
COMMENT:

Y-487 AUTHOR: WATERS, J. L. DATE: 1955-12-28
TITLE: SOLVENT HAZARDS COMMITTEE MEETING, NO. 5, DECEMBER 19, 1955; LETTER FROM J. L. WATERS TO L. E. BURKHART
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP
COMMENT: VENTILATION AIR CHANGES

Y-487 AUTHOR: TWICHELL, I. F. DATE: 1955-12-29
TITLE: TELEPHONE CONVERSATION WITH DR. W. C. GARDINER OR OLIN MATHIESON, LETTER FROM L. P. TWICHELL TO G. A. STRASSER
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: VISIT TO MATHIESON'S MERCURY CELLS FLANNED. NO CASE OF MERCURIALISM OCCURRED IN THEIR HISTORY.

Y-487 AUTHOR: PERRY, J. E. DATE: 1956-01-09
TITLE: DECONTAMINATION MEMO NO. 1 - RUBBER OVERTHOSES, LETTER FROM J. E. PERRY TO W. K. WHITSON
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP
COMMENT: OVERTHOSES TO BE WORN IN AREAS WHERE SOLVENT IS USED.

Y-487 AUTHOR: WATERS, J. L. DATE: 1956-01-13
TITLE: SOLVENT HAZARDS COMMITTEE MEETING, NO. 6, JANUARY 9, 1956; LETTER FROM J. L. WATERS TO L. E. BURKHART
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP
COMMENT: OBSERVATIONS MADE FOLLOWING LAKE STILL IN 9201-5

Y-487 AUTHOR: PERRY, J. E. DATE: 1956-01-19
TITLE: DECONTAMINATION MEMO NO. 2 - FLANGE GASKETS, LETTER FROM J. E. PERRY TO W. K. WHITSON
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP
COMMENT: BAN REUSE OF GASKETS IN SOLVENT OPERATING AREAS.

- 1-487 AUTHOR: PERRY, J. E. DATE: 1956-01-20
TITLE: DECONTAMINATION MEMO NO. 6 - FIELD REPLACEMENT OF ALPHA-4 RAFFINATE PUMP STATORS. LETTER FROM J. E. PERRY TO W. K. WHITSON
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CF
COMMENT: REPLACE PUMPS AS UNITS TO AVOID SPILLAGE OF SOLVENT-LADEN RAFFINATE.
- 1-487 AUTHOR: PERRY, J. E. DATE: 1956-01-20
TITLE: DECONTAMINATION MEMO NO. 3 - USE OF TOBACCO. LETTER FROM J. E. PERRY TO W. K. WHITSON
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CF
COMMENT: NO FOOD, CIGARETTES, OR TOBACCO ARE CARRIED INTO OPERATING AREAS WHERE SOLVENT IS USED.
- 1-487 AUTHOR: PERRY, J. E. DATE: 1956-01-20
TITLE: DECONTAMINATION MEMO NO. 6 - KINNEY PUMP DRAIN VALVE. LETTER FROM J. E. PERRY TO W. K. WHITSON
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CF
COMMENT: REDUCE SOLVENT CONTAMINATION BY ALLOWING RAFFINATE TO DRAIN TO THE FLOOR.
- 1-487 AUTHOR: WATERS, J. L. DATE: 1956-01-23
TITLE: SOLVENT HAZARDS COMMITTEE MTG., NO. 7, JANUARY 16, 1956; LETTER FROM J. L. WATERS TO L. E. BURKHART
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CF
COMMENT: LOWERING AIR COUNT AND MERCURY SOURCE TEMPERATURES
- 1-487 AUTHOR: PERRY, J. E. DATE: 1956-01-24
TITLE: DECONTAMINATION MEMO NO. 7 - LEAK COLLECTION BUCKETS. LETTER FROM J. E. PERRY TO W. K. WHITSON
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CF
COMMENT: PARTIALLY FILLED WATER BUCKETS PREVENT SOLVENT DROPLETS FROM SPATTERING AND INHIBIT SOLVENT VAPORIZATION.
- 1-497 AUTHOR: WATERS, J. L. DATE: 1956-01-28
TITLE: SOLVENT HAZARDS COMMITTEE MEETING, NO. 8, JANUARY 23, 1956; LETTER FROM J. L. WATERS TO L. E. BURKHART
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CF
COMMENT: VISITED MATTHEWS CHEMICAL COMPANY'S PLANT TO OBSERVE PRECAUTIONARY MEASURES EMPLOYED IN HANDLING MERCURY.

- 1-487 AUTHCR: WATERS, J. L. DATE: 1956-02-06
TITLE: SOLVENT HAZARDS COMMITTEE MTG. NO. 9, JANUARY 30, 1956, LETTER FROM J. L. WATERS TO L. E. BURKHARDT
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP
COMMENT: EFFECT OF AMBIENT TEMPERATURE; MERCURY VAPOR SUPPRESSANT.
- 1-487 AUTHOR: PERRY, J. E. DATE: 1956-02-07
TITLE: DECONTAMINATION MEMO NO. 4A - REVISED SOLVEX AND RAFFINATE PUMP REPLACEMENT PROCEDURES, LETTER FROM J. E. PERRY TO W. K. WHITSON
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CF
COMMENT: ENSURE MINIMUM SPILLAGE BY USE OF BUCKETS OR DRIP PANS PARTIALLY FILLED WITH WATER.
- 1-487 AUTHOR: WALDROP, F. B. DATE: 1956-02-08
TITLE: DECONTAMINATION MEMO NO. 8 - CLEANING OF RUBBER SHOES AND OVERSHOES, LETTER FROM F. B. WALDROP TO W. K. WHITSON
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CF
COMMENT: DETAILS PROCEDURE FOR REMOVING SOLVENT FROM RUBBER FOOTGEAR.
- 1-487 AUTHOR: WATERS, J. L. DATE: 1956-02-10
TITLE: SOLVENT HAZARDS COMMITTEE MEETING NC. 10, FEBRUARY 7, 1956, LETTER FROM J. L. WATERS TO L. E. BURKHARDT
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP
COMMENT: KEYHOE, CONSULTANT ON MERCURY, VISITED Y-12.
- 1-487 AUTHOR: PERRY, J. E. DATE: 1956-02-13
TITLE: DECONTAMINATION MEMO NO. 9 - DISMANTLING RECOMMENDATIONS FOR SCIVEX AND RAFFINATE PUMPS, LETTER FROM J. E. PERRY TO W. K. WHITSON
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP
COMMENT: METICULOUS REMOVAL OF SOLVENT FROM PUMPS REQUIRED.
- 1-487 AUTHOR: PERRY, J. E. DATE: 1956-02-13
TITLE: DECONTAMINATION MEMO NO. 10 - RECOMMENDED USE OF MERSORB RESPIRATORS, LETTER FROM J. E. PERRY TO W. K. WHITSON
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP
COMMENT: PERSONNEL PERFORMING CERTAIN OPERATIONS IN ALPHA 4 AND 5 SHOULD WEAR RESPIRATOR.

1-487 AUTHOR: PERRY, J. E. DATE: 1956-02-29
TITLE: DECONTAMINATION MEMO NO. 11 - RECOMMENDED HOUSEKEEPING PROCEDURE. LETTER FROM J. E. PERRY TO W. K. WHITSON
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP

COMMENT: PROCEDURES FOR GENERAL HOUSEKEEPING AND FOR CLEANING AREAS HIGHLY CONTAMINATED WITH SOLVENT.

1-487 AUTHOR: LITTLE, J. C. DATE: 1956-03-14
TITLE: SOLVENT LOSSES THROUGH VENTILATION EXHAUST SYSTEMS, BLDG. 9201-5. LETTER FROM J. C. LITTLE TO L. E. BURKHART
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP

COMMENT: SURVEY READINGS SHOW MERCURY LOSSES THROUGH VENTILATION EXHAUST SYSTEM OF 9201-5 TOTAL 22.5 POUNDS PER DAY.

1-487 AUTHOR: TWICHELL, L. P. DATE: 1956-05-16
TITLE: SPECIFICATION AND USAGE REQUIREMENTS FOR MERCURY VAPOR RESPIRATORS. LETTER FROM L. P. TWICHELL TO E. C. ELLIS
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP

COMMENT: RESPIRATORS TO BE CAPABLE OF REMOVING MINIMUM OF 99 PERCENT OF METALLIC MERCURY VAPOR.

1-487 AUTHOR: RADIATION SPTY DEPT DATE: 1956-06-11
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 2090-111-4 CLASS: U DRAWER: 13
CUSTODIAN: RC

COMMENT: USE AND DECONTAMINATION OF MERCURY VAPOR RESPIRATORS, SOLVENT HAZARDS.

1-487 AUTHOR: KITE, H. T. DATE: 1956-06-11
TITLE: USE AND DECONTAMINATION OF MERCURY VAFCR RESPIRATORS. LETTER FROM H. T. KITE TO H. T. KITE
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP

COMMENT: RECOMMENDATIONS FOR USE OF RESPIRATOR PROTECTIVE EQUIPMENT.

1-487 AUTHOR: KITE, H. T. DATE: 1957-12-13
TITLE: SOLVENT INVENTORY, BUILDING 9201-2. LETTER FROM H. T. KITE TO NELSON BETHEA
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP

COMMENT: LIST OF PERIODS WHEN MAJOR LOSSES OCCURRED. NET LOSS IS 82,473 POUNDS.

1-488 AUTHOR: RADIATION SFTY DEPT DATE: 1954-12-01
TITLE: RADIATION SAFETY
SUBJECT: HEALTH RECORDS
REPORT NUM: 2090-LH-4 CLASS: U DRAWER: 13
CUSTODIAN: RC
COMMENT: RESULTS OF POPULAR CREEK WATER ANALYSIS, 1955, E1

Y-488 AUTHOR: SANDERS, MERWYN DATE: 1956
TITLE: RESULTS OF POPLAR CREEK WATER ANALYSES 1-18-55 THRU 1-10-56
SUBJECT: HEALTH RECORDS
REPORT NUM:
CUSTODIAN:
COMMENT:

1-490 AUTHOR: VANWINKLE, W. DATE: 1982-09-07
TITLE: MERCURY CONTAMINATION IN EAST FORK POPLAR CREEK AND BEAR CREEK
SUBJECT: OPEN LITERATURE
REPORT NUM:
CUSTODIAN: CF
COMMENT: STUDY TO DETERMINE CONCENTRATION IN SEDIMENT, FISH, MOSS, GRASS AT EAST POPLAR CREEK & BEAK CREEK

1-491 AUTHOR: BUZZ, T. R. DATE: 1983-05-17
TITLE: MERCURY LOSSES TO EAST FORK POPLAR CREEK
SUBJECT: OPEN LITERATURE
REPORT NUM:
CUSTODIAN: CF
COMMENT: MERCURY LOSS FROM Y-12 PLANT

1-492 AUTHOR: DATE: 1970-08-06
TITLE: FISH ANALYSIS FOR MERCURY
SUBJECT: OPEN LITERATURE
REPORT NUM:
CUSTODIAN: CF
COMMENT: ANALYSIS IN FISH, WATER & MUD

1-493 AUTHOR: DATE: 1949-05
TITLE: PHYSICS PROGRESS REPORT FOR MAY, 1949
SUBJECT: MONTHLY REPORT, Y-12 PLANT HEALTH PHYSICS DIV
REPORT NUM: Y-429 CLASS: U DRAWER: 4
CUSTODIAN: CF
COMMENT:

1-494 AUTHOR: DATE: 1950-11 1950-12
TITLE: HEALTH PHYSICS PROGRESS REPORT FOR NOV-DEC, 1950
SUBJECT: MONTHLY REPORT, Y-12 PLANT HEALTH PHYSICS DIV.
REPORT NUM: Y-780 CLASS: U DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-495 AUTHOR: DATE: 1951-07 1951-12
TITLE: HEALTH PHYSICS PROGRESS REPORT FOR JULY-DEC, 1951
SUBJECT: MONTHLY REPORT, Y-12 PLANT HEALTH PHYSICS DIV.
REPORT NUM: Y-858 CLASS: U DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-496 AUTHOR: DATE: 1952-01 1952-07
TITLE: HEALTH PHYSICS PROGRESS REPORT FOR JAN-JULY, 1952
SUBJECT: MONTHLY REPORT, Y-12 PLANT HEALTH PHYSICS DIV.
REPORT NUM: Y-940 CLASS: U DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-497 AUTHOR: DATE: 1952-07 1952-12
TITLE: HEALTH PHYSICS PROGRESS REPORT FOR JULY-DEC, 1952
SUBJECT: MONTHLY REPORT, Y-12 PLANT HEALTH PHYSICS DIV.
REPORT NUM: Y-1066 CLASS: U DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-498 AUTHOR: DATE: 1953-01 1953-06
TITLE: HEALTH PHYSICS PROGRESS REPORT FOR JAN-JUNE, 1953
SUBJECT: MONTHLY REPORT, Y-12 PLANT HEALTH PHYSICS DIV.
REPORT NUM: Y-1074 CLASS: U DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-499 AUTHOR: DATE: 1953-07 1953-12
TITLE: HEALTH PHYSICS PROGRESS REPORT FOR JULY-DEC, 1953
SUBJECT: MONTHLY REPORT, Y-12 PLANT HEALTH PHYSICS DIV.
REPORT NUM: Y-1074 CLASS: U DRAWER: 4
CUSTODIAN: CP
COMMENT:

4-50) AUTHOR: DATE: 1965
TITLE: REPORTS OF EXCESS PERSONAL PROPERTY - BUILDING 9201-5
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT:

4-501 AUTHOR: DATE: 1968
TITLE: WORK SHEETS ON MISCELLANEOUS SALES - UCNC-954
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT:

4-502 AUTHOR: DATE: 1965
TITLE: EQUIPMENT CHARGED TO ACCOUNT 2611 IN 9201-5
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT:

4-503 AUTHOR: DATE: 1967
TITLE: COST ON PUMPS IN BUILDINGS 9201-4 AND 9201-5
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT:

4-504 AUTHOR: DATE: 1954
TITLE: ALPHA 5 - ELECTRICAL SYSTEM PROPERTY RECORDS
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. M.
COMMENT:

4-505 AUTHOR: CASE, J. M. DATE: 1979-05-09
TITLE: EXCESSING OF MERCURY FOR DISPOSAL BY GSA, LETTER FROM J. M. CASE (UCC) TO H. D. HICKMAN (DOE)
SUBJECT: CORRESPONDENCE, EXTERNAL (ALSC M-389, M-760)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: 12,000 FLASKS OF EXCESS MERCURY TO BE TRANSFERRED TO GSA.

- 1-516 AUTHOR: DATE: 1965
TITLE: 9201-5 STRIPPING IN DEPT. 2611
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. H.
COMMENT:
- 1-517 AUTHOR: DATE: 1966
TITLE: 9201-5 STRIPPING IN DEPT. 2909-2
SUBJECT: ACCOUNTING AND BUDGET DATA
REPORT NUM: CLASS: U DRAWER: 5
CUSTODIAN: KENDRICK, J. H.
COMMENT:
- 1-518 AUTHOR: DOW, NEAL DATE: 1962-10-17
TITLE: Y-12 EXCESS MERCURY, LETTER FROM NEAL DOW TO E. C. ELLIS
SUBJECT: CORRESPONDENCE, INTERNAL REPORT
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: EXCESS INVENTORY, TRANSFER
- 1-518 AUTHOR: HIBBS, F. F. DATE: 1962-11-13
TITLE: EXCESS MERCURY, LETTER FROM F. F. HIBBS TO ORAL RINEHART
SUBJECT: CORRESPONDENCE, INTERNAL REPORT
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: REPLY TO AEC ON SPECTROGRAPHIC ANALYSES
- 1-519 AUTHOR: DATE: 1956
TITLE: BETA-4 PLANT, 1956
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: S DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT: COMPIRATION OF CORRESPONDENCE AND ENGINEERING DRAWINGS

1-510 AUTHOR: BLUMKIN, S-HANIG, M DATE: 1956-09-17
TITLE: OPTIMUM FLOW RATES IN ALPHA-5, LETTER FROM S. BLUMKIN AND M. HANIG TO W. K. WHITSON
SUBJECT: CORRESPONDENCE (INTERNAL)
REPORT NUM: KOA-168 CLASS: S DRAWER: 17
CUSTODIAN: CP
COMMENT: FACTORS INVOLVED IN CHOICE OF FLOW RATE.

1-511 AUTHOR: DATE: 1974-08-22
TITLE: BIO-ANALYTICAL CONTROL SAMPLE RESULTS
SUBJECT: HEALTH RECORDS
REPORT NUM: Y-DI-24, 285 CLASS: S DRAWER: 13
CUSTODIAN:
COMMENT:

1-513 AUTHOR: DATE: 1953-1954
TITLE: MERCURY SHIPMENTS
SUBJECT: MERCURY SHIPMENT DATA
REPORT NUM: CLASS: U DRAWER: 7
CUSTODIAN: CF
COMMENT: COMPIRATION OF STORAGE AND SHIPMENT DATA

1-524 AUTHOR: DATE: 1957-01
TITLE: INFORMATION ON WASTE DISPOSAL AT Y-12 (PROCESS ENGINEERING DEPT.)
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B92-20 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-529 AUTHOR: SEPPAGUE, T. P. DATE: 1956-05
TITLE: PURIFICATION OF URANIUM BY SECONDARY CARBITOL EXTRACTION
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-82 CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-530 AUTHOR: KRIEG, A. DATE: 1956-09
TITLE: AMALGAM STABILITY CHARACTERISTICS IN THE ALPHA-4 PURIFIER COLUMN SYSTEM AND IN CASCADE 10
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-90 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-531 AUTHOR: WALDOE, F. B. DATE: 1955-10
TITLE: INCREASED PRODUCTION BY THE MINNEAPOLIS PLANT OF THE LITHIUM CORPORATION OF AMERICA

SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-68 CLASS: S DRAWER: 10
CUSTODIAN: CF
COMMENT:

1-532 AUTHOR: BALLAND, A. H. DATE: 1956-08
TITLE: REDUCTION OF CARBONATE CONTENT OF CCLEX EXTRACT
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-88 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-533 AUTHOR: KRIBS, A. DATE: 1955-07
TITLE: MASKING EFFECT OF SODIUM ON LITHIUM AMALGAM DECOMPOSITION
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-61 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-534 AUTHOR: SCHIMMEL, F. A. DATE: 1956-12
TITLE: SEPARATION OF SODIUM FROM LITHIUM IN A ROTATING CATHODE AMALGAM CELL
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-102 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-535 AUTHOR: STILES, C. J. DATE: 1956-12
TITLE: GRAPHITE FOR COLEX DECOMPOSERS
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-106 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-536 AUTHOR: WALDOE, F. B. DATE: 1956-10
TITLE: PURIFICATION OF ENRICHED LITHIUM SALVAGE
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-94 CLASS: S DRAWER: 10
CUSTODIAN: CF
COMMENT:

Y-537 AUTHOR: KPIEG, A. DATE: 1956-09
TITLE: PROGRESS REPORT ON TRAY VOLTAGE STUDIES
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-91 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-538 AUTHOR: KPIEG, A. DATE: 1956-11
TITLE: SYNERGISTIC EFFECTS IN THE DECOMPOSITION OF LITHIUM AMALGAM IN CONTACT WITH AQUEOUS LITHIUM HYDROXIDE
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-96 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-539 AUTHOR: KPIEG, A. DATE: 1956-07
TITLE: AMALGAM STABILITY CHARACTERISTICS OF PLANT ABSORBER TRAY SAMPLES
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-86 CLASS: S DRAWER: 10
CUSTODIAN: CF
COMMENT:

Y-540 AUTHOR: KRIEG, A. DATE: 1956-07
TITLE: DECOMPOSITION OF SODIUM AMALGAM
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-87 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-541 AUTHOR: KITE, H. T. DATE: 1956-03
TITLE: GRAPHITE FOR COLEX DECOMPOSERS
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-78 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-542 AUTHOR: LEVEY, R. P. DATE: 1956-03
TITLE: RECOMMENDATIONS FOR CONVERSIGN OF EILEX TRAYS TO COLEX TYPE TRAYS
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-76 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-543 AUTHOR: WHITEHEAD, H. D. DATE: 1956-03
TITLE: DENSITIES OF LID AND LIH VERSUS ISOSTATIC PRESSURE
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-77 CLASS: S DRAWER: 10
CUSTODIAN: CF
COMMENT:

Y-544 AUTHOR: FOWLER, A. H. DATE: 1956-01
TITLE: TWELVE-INCH CCLEX PILOT PLANT SECONDARY STUDIES RUNS 1-18
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-75 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-545 AUTHOR: TWICHELL, L. P. DATE: 1956-01
TITLE: INQUIRY ON PUMP DESIGN CONTRACTS
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-74 CLASS: S DRAWER: 10
CUSTODIAN: CF
COMMENT:

Y-547 AUTHOR: PEERY, J. E. DATE: 1955-11
TITLE: ALPHA-5 FLOODING EXPERIMENT
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-70 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-548 AUTHOR: TWICHELL, L. P. DATE: 1955-02
TITLE: DEVELOPMENT PROGRAM FOR CONTINUOUS AQUEOUS PHASE COLEX PROCESS
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-49 CLASS: S DRAWER: 10
CUSTODIAN: CF
COMMENT:

Y-549 AUTHOR: TWICHELL, L. P. DATE: 1955-03
TITLE: ECONOMIC EVALUATION OF ADP TAILS STORAGE
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-52 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-550 AUTHOR: KITE, H. T. DATE: 1955-10
TITLE: INCREASED AMALGAM FLOW IN ALPHA-5
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-67 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-552 AUTHOR: WALDFOP, F. B. DATE: 1953-04
TITLE: SUMMARY OF WORK ON ADP REACTION RATE STUDIES
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-3 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-553 AUTHOR: KITE, H. T. DATE: 1955-10
TITLE: ALPHA-5 FLOODING EXPERIMENT
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-69 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-554 AUTHOR: WILKINSON, P. E. DATE: 1953-02
TITLE: CALCULATION OF STAGE LENGTH FROM BATCH EXCHANGE DATA
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-1 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-555 AUTHOR: MAKPOW, G. B. DATE: 1953-12
TITLE: ANODE ERCTION IN THE INCLINED PLANE ABSORBER
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-16 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-556 AUTHOR: KITE, H. T. DATE: 1954-01
TITLE: SUMMARY OF 8 INCH COLEX - RUNS 23 THROUGH 33
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-20 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

- Y-557 AUTHOR: TWICHELL, L. P. DATE: 1954-09
TITLE: SUMMARY OF ASPEN SALVAGE MEETING
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-42 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:
- Y-558 AUTHOR: KITE, H. T. DATE: 1954-03
TITLE: VISIT BY ROBINS AND MYERS PERSONNEL ON MARCH 11, 1954, TO DISCUSS AMALGAM PUMP DESIGNS
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-27 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:
- Y-559 AUTHOR: TWICHELL, L. P. DATE: 1954-09
TITLE: SUMMARY OF SECND ASPEN SALVAGE MEETING
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-43 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:
- Y-560 AUTHOR: TWICHELL, L. P. DATE: 1954-10
TITLE: DEVELOPMENT PROGRAM FOR CONTINUOUS AQUEOUS PHASE COLEX PROCESS
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-45 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:
- Y-561 AUTHOR: WILKINSON, P. E. DATE: 1954-05
TITLE: SUMMARY OF 12-INCH COLEX RUNS 28 THROUGH 34
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-35 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:
- Y-562 AUTHOR: WILKINSON, P. E. DATE: 1954-05
TITLE: SUMMARY OF 12-INCH COLEX RUNS 35-38
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-36 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-563 AUTHOR: WILKINSON, P. E. DATE: 1954-05
TITLE: SUMMARY OF 12-INCH COLEX RUNS 15-27
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-34 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-564 AUTHOR: TWICHELL, L. P. DATE: 1954-04-15
TITLE: ESTIMATION OF CAPACITIES IN LITHIUM DEUTERIDE
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-33 CLASS: S DRAWER: 10
CUSTODIAN: PC
COMMENT:

1-565 AUTHOR: TWICHELL, L. P. DATE: 1954-04-14
TITLE: RE-EVALUATION OF SAVINGS FROM OPERATIONS OF ALPHA-4 WITH THE AQUEOUS PHASE CONTINUOUS
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-32 CLASS: S DRAWER: 10
CUSTODIAN: RC
COMMENT:

1-566 AUTHOR: WILKINSON, P. E. DATE: 1954-04-07
TITLE: MULTI - COLUMN TEST PROGRAM PCR COLEX
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-30 CLASS: S DRAWER: 10
CUSTODIAN: RC
COMMENT:

1-567 AUTHOR: TWICHELL, L. P. DATE: 1954-04-13
TITLE: PRESSURE VESSEL CAPACITY
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-31 CLASS: S DRAWER: 10
CUSTODIAN: PC
COMMENT:

1-568 AUTHOR: WILKINSON, P. E. DATE: 1954-03-15
TITLE: SUMMARY OF RUNS 1-14, 12-INCH COLEX PILOT PLANT
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-28 CLASS: S DRAWER: 10
CUSTODIAN: RC
COMMENT:

1-569 AUTHOR: KRCG, H. P. DATE: 1954-03-26
TITLE: REPORT CP CO-OP WORK OF H. P. KROG
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-29 CLASS: S DRAWER: 10
CUSTODIAN: RC
COMMENT:

1-570 AUTHOR: FOOTENBEY, M. J. DATE: 1953-10-20
TITLE: COLEX RUN SUMMARY THREE-INCH SPRAY COLUMN
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-E65-12 CLASS: S DRAWER: 10
CUSTODIAN: RC
COMMENT:

1-571 AUTHOR: FOOTENBEY, M. J. DATE: 1953-11-03
TITLE: COLEX RUN SUMMARY, THREE-INCH DIAMETER COLUMN USING AQUEOUS WETTED PACKING
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-13 CLASS: S DRAWER: 10
CUSTODIAN: PC
COMMENT:

1-572 AUTHOR: KITE, H. T. DATE: 1953-10-06
TITLE: VISIT OF DR. GARDNER OF MATHIESON CHEMICAL CO. ON SEPTEMBER 17 AND 18, 1953 TO REVIEW DESIGNS AND CONSULT CN PRODUCTION E&JU
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-11 CLASS: S DRAWER: 10
CUSTODIAN: PC
COMMENT:

1-573 AUTHOR: BENNETT, R. K. DATE: 1953-09-08
TITLE: FLOODING STUDIES IN TWO-INCH STEEL COLUMN
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-10 CLASS: S DRAWER: 10
CUSTODIAN: RC
COMMENT:

1-574 AUTHOR: DATE: 1953-05-29
TITLE: ELEX PILOT PLANT DATA
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-4 CLASS: S DRAWER: 10
CUSTODIAN: RC
COMMENT:

1-575 AUTHOR: FORTENBERRY, M. J. DATE: 1953-12-04
TITLE: COLEX RUN SUMMARY, THREE-INCH DIAMETER COLUMN USING AMALGAM-WETTED-PACKING
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-15 CLASS: S DRAWER: 10
CUSTODIAN: RC
COMMENT:

1-576 AUTHOR: KITE, H. T. DATE: 1953-12-22
TITLE: SUMMARY OF 8-INCH COLEX PUNS 10-22
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-19 CLASS: S DRAWER: 10
CUSTODIAN: PC
COMMENT:

1-577 AUTHOR: KITE, H. T. DATE: 1953-12-17
TITLE: PURIFICATION PROCESSES
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-17 CLASS: S DRAWER: 10
CUSTODIAN: RC
COMMENT:

1-578 AUTHOR: KRIES, A. DATE: 1953-12-17
TITLE: FLOODING STUDIES IN TWO-INCH STEEL, GRAPHITE-PACKED COLUMN
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-18 CLASS: S DRAWER: 10
CUSTODIAN: RC
COMMENT:

1-579 AUTHOR: KITE, H. T. DATE: 1954-02-09
TITLE: PUMPS FOR THE ALLOY DEVELOPMENT PROGRAM
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-26 CLASS: S DRAWER: 10
CUSTODIAN: RC
COMMENT:

1-580 AUTHOR: TAYLOR, H. G. DATE: 1953-12-11
TITLE: VISIT TO THE LITHIUM CORPORATION OF AMERICA, MINNEAPOLIS, MINNESOTA
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-25 CLASS: S DRAWER: 10
CUSTODIAN: RC
COMMENT:

1-581 AUTHOR: KITE, H. T. DATE: 1954-01-20
TITLE: SUMMARY OF 8-INCH COLEX. RUNS 39 THROUGH 44
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-23 CLASS: S DRAWER: 10
CUSTODIAN: RC
COMMENT:

1-582 AUTHOR: FORTENBERRY, M. J. DATE: 1954-01-25
TITLE: 3-INCH COLEX RUN SUMMARIES
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-24 CLASS: S DRAWER: 10
CUSTODIAN: RC
COMMENT:

1-583 AUTHOR: KITE, H. T. DATE: 1954-01-19
TITLE: SUMMARY OF 8-INCH COLEX RUNS 1-9 AND 34-38
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-B65-22 CLASS: S DRAWER: 10
CUSTODIAN: RC
COMMENT:

1-584 AUTHOR: DATE: 1982
TITLE: MERCURY ANALYSIS OF PISH AND FESCUE GRASS BY QUALITY DIV
SUBJECT: TECHNICAL MEMO
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: QUALITY DIVISION
COMMENT:

1-585 AUTHOR: DINKINS, C. C. DATE: 1957-08-29
TITLE: RAW DATA FOR COLEX REPORTS-ALPHA 5 AUGUST 1957 TO MAY 1959
SUBJECT: PRODUCTION OPERATIONS RECORDS
REPORT NUM: Y-NB-2197 CLASS: S DRAWER: 11
CUSTODIAN:
COMMENT:

1-587 AUTHOR: DINKINS, C. C. DATE: 1959-06-10
TITLE: RAW DATA FOR COLEX REPORTS APR 1959 TO JULY 1962
SUBJECT: PRODUCTION OPERATIONS RECORDS
REPORT NUM: Y-NB-2320 CLASS: S DRAWER: 11
CUSTODIAN:
COMMENT:

4-588 AUTHOR: DINKINS, C. C. DATE: 1962-09-04
TITLE: RAW DATA FOR COLEX REPORTS AUG 1962 TC MAY 1963
SUBJECT: PRODUCTION OPERATIONS RECORDS
REPORT NUM: Y-NB-2619 CLASS: S DRAWER: 11
CUSTODIAN:
COMMENT:

4-589 AUTHOR: TAUSCHE, P. E. DATE: 1953-08-26
TITLE: RAW DATA FOR COLEX REPORTS, JAN 1953 TO JULY 1957
SUBJECT: PRODUCTION OPERATING RECORDS
REPORT NUM: Y-NB-1943 CLASS: S DRAWER: 11
CUSTODIAN: CP
COMMENT:

4-591 AUTHOR: DOW, N. DATE: 1958
TITLE: OPERATION OF THE CCLEX XYXTEM FOR FISCAL YEAR 1958
SUBJECT: PRODUCTION OPERATIUNS RECORDS
REPORT NUM: Y-BD-58 CLASS: S DRAWER: 10
CUSTODIAN:
COMMENT:

4-592 AUTHOR: DATE: 1955-08 1966-12
TITLE: DAILY PRODUCTION RECORDS-FEED & TAILS RECEIPTS & USAGE, AUG 1955 TO DEC 1966
SUBJECT: PRODUCTION OPERATIUNS RECORDS
REPORT NUM: Y-F42-151 CLASS: S DRAWER: 11
CUSTODIAN:
COMMENT:

4-599 AUTHOR: CENTER, C. E. DATE: 1955-07-28
TITLE: METHODS FOR SEPARATING LITHIUM ISOTOPES, LETTER FROM C. E. CENTER (UCC) TO S. R. SAPIRIE (AEC)

SUBJECT: CORRESPONDENCE (EXTERNAL)

REPORT NUM: KA-416 CLASS: S DRAWER: 17
CUSTODIAN: CP

COMMENT: METHODS OF SEPARATION WHICH DO NOT REQUIRE LARGE AMOUNTS OF MERCURY.

4-601 AUTHOR: MURRAY, J. P. DATE: 1954-07-15
TITLE: ADDITIONAL VENTILATION FOR THE BETA-4 CASCADE, LETTER FROM J. P. MURRAY (UCC) TO R. C. ARMSTRONG (AEC)
SUBJECT: CORRESPONDENCE (EXTERNAL)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: EXCESSIVE SOLVENT CONCENTRATIONS IN AIR DUE TO SUMMER HEAT AND HIGH OPERATING POWER LEVEL.

1-602 AUTHOR: DATE: 1952-1953

TITLE: ADP ELEX OPERATIONS (SOLVENT)

SUBJECT: ACCOUNTING AND BUDGET DATA

REPORT NUM: CLASS: S DRAWER: 5

CUSTODIAN: CP

COMMENT: COMPILATION OF CORRESPONDENCE AND WORKSHEETS

1-603 AUTHOR: SAPIRIE, S. R. DATE: 1956-03-21

TITLE: SHUTDWN OF BETA-4 PLANT. LETTER FROM S. R. SAPIRIE (AEC) TO C. E. CENTER (UCC)

SUBJECT: CORRESPONDENCE, EXTERNAL

REPORT NUM: ORC77113 CLASS: S DRAWER: 17

CUSTODIAN: CF

COMMENT: PLAN TO DEVELOP INFO ON SHUTDOWN FOR STANDBY CASES

1-603 AUTHOR: WHITSON, W. K. DATE: 1956-04-02

TITLE: BETA-4 STANDBY STATUS. LETTER FROM W. K. WHITSON TO J. H. CASE ET AL

SUBJECT: CORRESPONDENCE, INTERNAL

REPORT NUM: CLASS: U DRAWER: 17

CUSTODIAN: CP

COMMENT: READY STANDBY CONDITION. CONSOLIDATED BUDGET INFO. SUMMARY OF WORK SHEETS FOR STARTUP AFTER LONG-TERM SHUTDOWN.

1-613 AUTHOR: ELLIS, E. C. DATE: 1956-04-02

TITLE: SHUTDOWN OF BETA-4. LETTER FROM E. C. ELLIS TO ORAL FINEHART

SUBJECT: CORRESPONDENCE, INTERNAL

REPORT NUM: CLASS: U DRAWER: 17

CUSTODIAN: CP

COMMENT: DISPOSITION OF COSTS

1-603 AUTHOR: DOW, NEAL DATE: 1956-04-25

TITLE: BETA-4 SOLVENT. LETTER FROM NEAL DOW TO E. C. ELLIS

SUBJECT: CORRESPONDENCE, INTERNAL

REPORT NUM: CLASS: U DRAWER: 17

CUSTODIAN: CP

COMMENT: ALPHA-4 COLEX OPERATIONS. CHARGE CODES FOR ACCOUNTS.

1-603 AUTHOR: CENTER, C. E. DATE: 1956-05-08

TITLE: SHUTDOWN OF BETA-4. LETTER FROM C. E. CENTER (UCC) TO S. R. SAPIRIE (AEC)

SUBJECT: CORRESPONDENCE, EXTERNAL

REPORT NUM: KA-455 CLASS: S DRAWER: 17

CUSTODIAN: CP

COMMENT: DETAILED INFO ON READY AND ICNG-TERM STANDBY AND REACTIVATION OF BETA-4.

- Y-603 AUTHOR: DATE: 1956-06-01
TITLE: REASONS FOR STRIPPING BLDG 9 204-4, OUTLINE DRAFT
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DPAWER: 17
CUSTODIAN: CP
COMMENT: HANDWRITTEN ROUGH DRAFT. VALUE OF MATERIALS AND OTHER CONSIDERATIONS. RECOMMENDED METHODS.
- Y-603 AUTHOR: CENTER, C. E. DATE: 1956-06-15
TITLE: RECOMMENDATION ON DISPOSITION OF THE BETA-4 ELEX FACILITY. LETTER FROM CLARK E. CENTER (UCC) TO S. R. SAPPIRE (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: KA-461 CLASS: S DRAWER: 17
CUSTODIAN: CP
COMMENT: RESULTS OF STUDY ON DISPOSITION BETA-4
- Y-603 AUTHOR: WALKER, R. A. DATE: 1956-08-01
TITLE: BUILDING 92-4-4 STRIPPING PROPOSAL, LETTER FROM R. A. WALKER TO W. K. WHITSON ET AL.
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:
- Y-603 AUTHOR: ARMSTRONG, R. C. DATE: 1956-08-02
TITLE: SECURITY CLASSIFICATION, BETA-4 DISMANTLING. LETTER FROM J. P. MURRAY (UCC) TO R. C. ARMSTRONG (AEC)
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: RECLASSIFICATION REQUIREMENTS
- Y-603 AUTHOR: JENNINGS, D. A. DATE: 1956-08-03
TITLE: STRIPPING OF BETA-4, LETTER FROM D. A. JENNINGS TO W. K. WHITSON
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT: COMMENTS ON BETA-4 STRIPPING PROPOSAL.
- Y-603 AUTHOR: WHITSON, W. K. DATE: 1956-08-13
TITLE: STRIPPING OF BETA-4, LETTER FROM W. K. WHITSON TO G. B. LOCKHART
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT: COMMENTS ON BETA-4 STRIPPING PROPOSAL.

1-603 AUTHOR: WALKER, R. A. DATE: 1956-09-17
TITLE: STRIPPING OF BETA-4, LETTER FROM R. A. WALKER TO J. H. CASE ET AL.
SUBJECT: CORRESPONDENCE, INTERNAL REPORT NUM: CLASS: U DRAWER: 17

CUSTODIAN: CP

COMMENT: DISPOSAL ON STRIPPED EQUIPMENT

1-603 AUTHOR: ELLIS, E. C. DATE: 1956-09-18
TITLE: STRIPPING OF BUILDING 92-4-4, LETTER FRM E. C. ELLIS TO J. H. CASE ET AL.
SUBJECT: CORRESPONDENCE, INTERNAL REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT: ACCOUNTS FOR COSTS AND SALVAGE CREDITS

1-603 AUTHOR: KOONTZ, L. F. DATE: 1956-09-24
TITLE: AVAILABILITY OF 100-KVA UNIT SUBSTATIONS, BLDG 9204-4, LETTER FROM L. F. KOONTZ TO R. A. WALKER
SUBJECT: CORRESPONDENCE, INTERNAL REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: UNIT SUBSTATIONS

1-603 AUTHOR: ELLIS, E. C. DATE: 1956-10-01
TITLE: STRIPPING OF BLDG 92-4-4, LETTER FRM E. C. ELLIS TO J. H. CASE ET AL.
SUBJECT: CORRESPONDENCE, INTERNAL REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT: METHODS OF HANDLING TRANSFER OF MATERIALS AND EQUIPMENT

1-603 AUTHOR: MURRAY, J. P. DATE: 1957-05-22
TITLE: REQUEST FOR MODIFICATION, DISMANTLEMENT AND DISPOSAL OF BETA-4 PLANT, LETTER FRM J. P. MURRAY (UCC) TO R. C. ARMSTRONG (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: DIRECTIVE Y-12-130. PROJECT 224-57R-1. SUMMARY OF SALVAGE MATERIALS.

1-603 AUTHOR: MURRAY, J. P. DATE: 1957-07-01
TITLE: DISMANTLEMENT AND DISPOSAL OF BETA-4 PLANT, PROJ. 224-57-R-1, LETTER FROM J. P. MURRAY TO ORAL HINEHART
SUBJECT: CORRESPONDENCE, INTERNAL REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: COSTS INVOLVED

1-604 AUTHOR: DATE: 1955-05
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR MAY 1955
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-15 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

1-605 AUTHOR: DATE: 1955-06
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR JUNE 1955
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-16 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

1-606 AUTHOR: DATE: 1955-07
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR JULY, 1955
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-17 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

1-607 AUTHOR: DATE: 1955-08
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR AUG., 1955
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-18 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

1-608 AUTHOR: DATE: 1955-10
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR OCT., 1955
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-20 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

1-609 AUTHOR: DATE: 1955-11
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR NOV., 1955
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-21 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

1-611 AUTHOR: DATE: 1955-12
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR DEC. 1955
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-P40-22 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-612 AUTHOR: DATE: 1955-11
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR NOV. 1955
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-P40-24 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-613 AUTHOR: DATE: 1955-12
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR DEC. 1955
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-P40-25 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-614 AUTHOR: DATE: 1956-01
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR JAN. 1956
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-P40-26 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-615 AUTHOR: DATE: 1956-02
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR FEB. 1956
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-P40-27 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-616 AUTHOR: DATE: 1956-03
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR MARCH. 1956
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-P40-28 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

4-617 AUTHOR: DATE: 1956-04
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR APRIL, 1956
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-35 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

4-618 AUTHOR: WHITSON, W. K. DATE: 1956
TITLE: SURVEY CP ECONOMY MEASURES FOR YEAR 1956 (ALLOY DIV.)
SUBJECT: TECHNICAL MEMO
REPCPT NUM: Y-F40-36 CLASS: S DRAWER: 10
CUSTODIAN: CF
COMMENT: COLEX OPERATIONS 9201-4 & 5

4-619 AUTHOR: DATE: 1956-05
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR MAY, 1956
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-38 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

4-620 AUTHOR: DATE: 1956-02
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR FEB., 1956
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-39 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

4-621 AUTHOR: DATE: 1955-03
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR MARCH 1955
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-40 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

4-622 AUTHOR: DATE: 1956-04
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR APRIL, 1956
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-41 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

4-623 AUTHOR: DATE: 1956-05
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR MAY 1956
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-42 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

4-624 AUTHOR: DATE: 1956-06
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR JUNE, 1956
SUBJECT: MONTHLY PEPCT, ALLOY DIV.
REPORT NUM: Y-F40-43 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

4-625 AUTHOR: DATE: 1956-08
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR AUGUST 8, 1956
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-44 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

4-626 AUTHOR: DATE: 1956-06
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR JUNE, 1956
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-45 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

4-627 AUTHOR: DATE: 1956-07
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR JULY, 1956
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-46 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

4-628 AUTHOR: DATE: 1956-08
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR AUGUST, 1956
SUBJECT: MONTHLY PEPCT, ALLOY DIV.
REPORT NUM: Y-F40-47 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

Y-629 AUTHOR: DATE: 1956-09
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR SEPTEMBER, 1956
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-P40-49 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-630 AUTHOR: DATE: 1956-02-15
TITLE: BETA-4 SHUTDOWN, ESTIMATED COST DRAFT.
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: LEDGER SHEET DRAFT OF COSTS

Y-630 AUTHOR: LEVEY, R. P. DATE: 1956-02-15
TITLE: RECOMMENDATIONS FOR CONVERSION OF ELEX TRAYS TO COLEX TYPE TRAYS. LETTER FROM R. P. LEVEY TO NEAL DOW ET AL.
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: Y-B65-76 CLASS: S DRAWER: 17
CUSTODIAN: CP
COMMENT: DETAILED INFORMATION ON CONVERSION

Y-630 AUTHOR: CENTER, C. E. DATE: 1956-02-21
TITLE: COLEX DEVELOPMENT AND PRODUCTION PLANNING. LETTER FROM C. E. CENTER (UCC) TO S. R. SAPIRIE (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: KA-443 CLASS: S DRAWER: 17
CUSTODIAN: CP
COMMENT: RECOMMENDATIONS AND COMMENTS ON NEW COLEX PILOT PLANT FACILITY. BETA-4 SHUTDOWN. MERCURY RECOVERY.

Y-630 AUTHOR: TAYLOR, M. L. DATE: 1956-05-18
TITLE: COST ESTIMATES FOR STRIPPING BLDG 9204-4 PREPARED BY M. L. TAYLOR
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: STRIP BLDG 9204-4 (C.P.F.P.) SALVAGE VALUE

Y-630 AUTHOR: DATE: 1956-10
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR OCTOBER, 1956
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-52 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-631 AUTHOR: DATE: 1956-11
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR NOVEMBER, 1956
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-53 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

1-632 AUTHOR: DATE: 1956-08
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR AUG. 1956
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-54 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

1-633 AUTHOR: DATE: 1956-09
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR SEPT. 1956
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-55 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

1-634 AUTHOR: DATE: 1956-10
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR OCT. 1956
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-56 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

1-635 AUTHOR: DATE: 1956-11
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR NOV., 1956
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-57 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-636 AUTHOR: DATE: 1956-01
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR JAN., 1956
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-23 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

Y-637 AUTHOR: DATE: 1956-12
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR DECEMBER, 1956
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-58 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-638 AUTHOR: DATE: 1956-12
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR DEC, 1956
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-63 CLASS: S DRAWER: 4
CUSTODIAN: RC
COMMENT:

Y-639 AUTHOR: DATE: 1958-01
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR JAN, 1958
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-67 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

Y-640 AUTHOR: DATE: 1958-02
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR FEB, 1958
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-89 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-641 AUTHOR: DATE: 1958-03
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR MARCH, 1958
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-90 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-642 AUTHOR: DATE: 1958-04
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR APRIL, 1958
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-94 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

Y-643 AUTHOR: DATE: 1958-05
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR MAY, 1958
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-96 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-644 AUTHOR: DATE: 1958-06
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR JUNE, 1958
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-97 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-645 AUTHOR: DATE: 1958-07
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR JULY, 1958
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-101 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-646 AUTHOR: DATE: 1958-08
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR AUG., 1958
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-103 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-647 AUTHOR: DATE: 1958-09
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR SEPT., 1958
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-106 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-648 AUTHOR: DATE: 1958-10
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR OCT., 1958
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-108 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

M-649 AUTHOR: DATE: 1958-11
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR NOV, 1958
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-111 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-650 AUTHOR: DATE: 1958-12
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR DEC, 1958
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-113 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-651 AUTHOR: DATE: 1959-01
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR FEB, 1959
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-115 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-653 AUTHOR: DATE: 1959-02
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR FEB, 1959
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-117 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-654 AUTHOR: DATE: 1959-02
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORTS FOR FEB, 1959
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-118 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-655 AUTHOR: DATE: 1959-03
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR MARCH, 1959
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-119 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-656 AUTHOR: DATE: 1959-03
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR MARCH, 1959
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-121 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-657 AUTHOR: DATE: 1959-04
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR APRIL, 1959
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-122 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-658 AUTHOR: DATE: 1959-05
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR MAY, 1959
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-123 CLASS: S DRAWER: 4
CUSTODIAN: CF
COMMENT:

1-659 AUTHOR: DATE: 1959-06
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR JUNE, 1959
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-124 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-660 AUTHOR: DATE: 1959-07
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR JULY, 1959
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-125 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

1-661 AUTHOR: DATE: 1959-01
TITLE: ALLOY DIVISION WEEKLY PROGRESS REPORT FOR JAN 1959
SUBJECT: WEEKLY REPORT, ALLOY DIV.
REPCPT NUM: Y-F40-116 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-661 AUTHOR: DATE: 1959-01
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR AUG. 1959
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-126 CLASS: S DRAWER: 4
CUSTODIAN: CP
COMMENT:

Y-662 AUTHOR: DATE: 1959-09
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR SEPT. 1959
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-127 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

Y-663 AUTHOR: DATE: 1959-10
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR OCT. 1959
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-128 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

Y-664 AUTHOR: DATE: 1959-11
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR NOV. 1959
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-130 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

Y-665 AUTHOR: DATE: 1959-12
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR DEC. 1959
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-132 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

Y-666 AUTHOR: DATE: 1960-01
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR JAN. 1960
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-133 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

1-667 AUTHOR: DATE: 1960-02
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR FEB. 1960
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-P40-134 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

1-669 AUTHOR: DATE: 1960-04
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR APRIL, 1960
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-P40-135 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

1-670 AUTHOR: DATE: 1960-05
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR MAY, 1960
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-P40-136 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

1-671 AUTHOR: DATE: 1960-05
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR MAY, 1960
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-P40-137 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

1-672 AUTHOR: DATE: 1960-06
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR JUNE, 1960
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-P40-138 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

1-672 AUTHOR: DATE: 1960-07
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR JULY, 1960
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-P40-139 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

Y-673 AUTHOR: DATE: 1960-08
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR AUG.
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-140 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

Y-674 AUTHOR: DATE: 1960-09
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR SEPT.
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-141 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

Y-675 AUTHOR: DATE: 1960-11
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR NOV.
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-142 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

Y-676 AUTHOR: DATE: 1960-11
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR NOV.
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-144 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

Y-677 AUTHOR: DATE: 1960-12
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR DEC.
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-145 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

Y-678 AUTHOR: DATE: 1961-01
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR JAN.
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-146 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

1-679 AUTHOR: DATE: 1961-02
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR FEB., 1961
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-148 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

1-680 AUTHOR: DATE: 1961-03
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR MARCH, 1961
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-149 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

1-681 AUTHOR: DATE: 1961-04
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR APRIL, 1961
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-150 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

1-682 AUTHOR: DATE: 1961-05
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR MAY, 1961
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-151 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

1-683 AUTHOR: DATE: 1961-06
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR JUNE, 1961
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-153 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

1-684 AUTHOR: DATE: 1961-07
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR JULY, 1961
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-154 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

1-685 AUTHOR: DATE: 1961-08
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR AUG, 1961
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-155 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

1-686 AUTHOR: DATE: 1961-09
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR SEPT, 1961
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-156 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

1-687 AUTHOR: DATE: 1961-10
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR OCT, 1961
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-157 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

1-688 AUTHOR: DATE: 1961-11
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR NOV, 1961
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-158 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

1-689 AUTHOR: DATE: 1961-12
TITLE: ALLOY DIVISION MONTHLY PROGRESS REPORT FOR DEC, 1961
SUBJECT: MONTHLY REPORT, ALLOY DIV.
REPORT NUM: Y-F40-160 CLASS: S DRAWER: 5
CUSTODIAN: CP
COMMENT:

1-690 AUTHOR: DATE: 1973-07 1973-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPTEMBER, 1973
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1891 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-12 MERCURY DATA BASE

PAGE : 175

1-691 AUTHOR: DATE: 1974-01 1974-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JANUARY-MARCH, 1974
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1893 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-692 AUTHOR: DATE: 1974-04 1974-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1974
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1894 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-693 AUTHOR: DATE: 1974-07 1974-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPTEMBER, 1974
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1895 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-694 AUTHOR: DATE: 1974-10 1974-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCTOBER-DECEMBER, 1974
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1896 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-695 AUTHOR: DATE: 1975-01 1975-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JANUARY-MARCH, 1975
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1897 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-696 AUTHOR: DATE: 1975-04 1975-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1975
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1898 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-697 AUTHOR: DATE: 1975-07 1975-09
TITLE: Y-12 QUARTERLY REPORT, JULY-SEPTEMBER, 1975
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1899 CLASS: S DRAWER: 2
CUSTODIAN: CF
COMMENT:

1-698 AUTHOR: DATE: 1975-10 1975-12
TITLE: Y-12 QUARTERLY REPORT, OCTOBER-DECEMBER, 1975
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2030 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-699 AUTHOR: DATE: 1976-01 1976-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JANUARY-MARCH, 1976
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2031 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-700 AUTHOR: DATE: 1976-04 1976-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL-JUNE, 1976
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2032 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-701 AUTHOR: DATE: 1976-07 1976-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPTEMBER, 1976
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2033 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-702 AUTHOR: DATE: 1976-10 1976-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCTOBER-DECEMBER, 1976
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2034 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-703 AUTHOR: DATE: 1977-01 1977-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JANUARY-MARCH, 1977
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2035 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-704 AUTHOR: DATE: 1977-07 1977-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPTEMBER, 1977
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2037 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-705 AUTHOR: DATE: 1977-10 1977-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCTOBER-DECEMBER, 1977
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2038 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-706 AUTHOR: DATE: 1978-01 1978-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JAN - MARCH 1978
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2039 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-707 AUTHOR: DATE: 1978-04 1978-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL - JUNE 1978
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2150 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-708 AUTHOR: DATE: 1978-07 1978-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY - SEPT 1978
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2151 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-709 AUTHOR: DATE: 1978-10 1978-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCT - DEC 1978
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2152 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-710 AUTHOR: DATE: 1979-01 1979-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JAN - MARCH 1979
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2153 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-711 AUTHOR: DATE: 1979-04 1979-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL - JUNE 1979
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2154 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-712 AUTHOR: DATE: 1979-07 1979-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY - SEPT 1979
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2155 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-713 AUTHOR: DATE: 1979-10 1979-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCT - DEC 1979
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2156 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

1-714 AUTHOR: DATE: 1980-01 1980-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JAN - MARCH 1980
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2157 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-715 AUTHOR: DATE: 1980-04 1980-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL - JUNE 1980
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2158 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-716 AUTHOR: DATE: 1980-07 1980-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY - SEPT 1980
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2159 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-717 AUTHOR: DATE: 1980-10 1980-12
TITLE: Y-12 PLANT QUARTERLY REPORT, OCT - DEC 1980
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2310 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-718 AUTHOR: DATE: 1981-01 1981-03
TITLE: Y-12 PLANT QUARTERLY REPORT, JAN - MARCH 1981
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2311 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-719 AUTHOR: DATE: 1981-04 1981-06
TITLE: Y-12 PLANT QUARTERLY REPORT, APRIL - JUNE 1981
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2312 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-720 AUTHOR: DATE: 1981-07 1981-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY - SEPT 1981
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2313 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-720 AUTHOR: DATE: 1981-07 1981-09
TITLE: Y-12 QUARTERLY REPORT, JULY - SEPT 1981
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1213 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-721 AUTHOR: DATE: 1981-10 1981-12
TITLE: Y-12 PLANT QUARTERLY REPORT, CCT - DEC 1981
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-2314 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-723 AUTHOR: TASK FCFCE DATE: 1956-06-21
TITLE: ADP PROGRAM AT Y-12-SURVEY AND LNG-RANGE PLANNING
SUBJECT: TECHNICAL REPORT
REPORT NUM: Y-1133 CLASS: S DRAWER: 10
CUSTODIAN: CF
COMMENT: THIS IS BUT ONE OF MANY PLANNING REPORTS, OTHERS HAVE NOT BEEN INDEXED.

Y-723 AUTHOR: DATE: 1977
TITLE: ENVIRONMENTAL MONITORING REPORT
SUBJECT: OPEN LITERATURE
REPORT NUM: Y-UB-8 CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT: CALCULATIONS OF POTENTIAL RADIATION TO PUBLIC

Y-724 AUTHOR: DATE: 1972-07 1972-09
TITLE: Y-12 PLANT QUARTERLY REPORT, JULY-SEPTEMBER, 1972
SUBJECT: QUARTERLY REPORT, Y-12 PLANT
REPORT NUM: Y-1767 CLASS: S DRAWER: 2
CUSTODIAN: CP
COMMENT:

Y-725 AUTHOR: DATE: 1980
TITLE: DOCUMENTATION OF THE THRESHOLD LIMIT VALUES - FOURTH EDITION
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: CF
COMMENT: MATERIAL ON MANGANESE TETOXIDE, MERCURY

1-726 AUTHOR: US DEPT. OF HEW DATE: 1973
TITLE: CRITERIA FOR A RECOMMENDED STANDARD OCCUPATIONAL EXPOSURE TO INORGANIC MERCURY
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: CF
COMMENT: NIOSH PROJECTS FORMAL SYSTEM OF RESEARCH.

1-727 AUTHOR: ROTHSTEIN, A. DATE: 1956-11
TITLE: CHRONIC MERCURY POISONING: AN EVALUATION OF OUR PRESENT KNOWLEDGE
SUBJECT: OPEN LITERATURE
REPORT NUM: UF-468 CLASS: U DRAWER: 19
CUSTODIAN: CF
COMMENT: THE PROBLEM OF CHRONIC MERCURY POISONING IS REVIEWED.

1-728 AUTHOR: SPIEGL, C. J. DATE: 1956
TITLE: THE INDUSTRIAL HYGIENE AND TOXICOLOGY OF MERCURY
SUBJECT: OPEN LITERATURE CLASS: U DRAWER: 19
REPORT NUM:
CUSTODIAN: CF
COMMENT: BASIS FOR THE MAC (REPORT BY ROCHESTER UNIV)

1-729 AUTHOR: RIDLEY, W. P. DATE: 1977-07-22
TITLE: BIOMETHYLATION OF TOXIC ELEMENTS IN THE ENVIRONMENT
SUBJECT: OPEN LITERATURE CLASS: U DRAWER: 19
REPORT NUM:
CUSTODIAN: CF
COMMENT: PUBLISHED IN JULY 22, 1977, ISSUE OF SCIENCE.

1-730 AUTHOR: SMITH, R. G. DATE: 1970-11
TITLE: EFFECTS OF EXPOSURE TO MERCURY IN THE MANUFACTURE OF CHLORINE
SUBJECT: OPEN LITERATURE CLASS: U DRAWER: 19
REPORT NUM:
CUSTODIAN: CP
COMMENT: STUDY REVEALED THAT ALL EMPLOYEES STUDIED APPEARED TO BE IN GOOD HEALTH. ARTICLE APPEARED IN AMERICAN INDUSTRIAL HYGIENE JOURNAL.

1-731 AUTHOR: DATE: 1976-07
TITLE: BEHAVIOR OF MERCURY IN SUSPENDED SOILS AND BOTTOM SEDIMENTS
SUBJECT: OPEN LITERATURE CLASS: U DRAWER: 19
REPORT NUM:
CUSTODIAN: CP
COMMENT: METHYLATION, MERCURIC SULFIDE

- Y-732 AUTHOR: WOOD, J. H. DATE: 1968
TITLE: SYNTHESIS OF METHYL-MERCURY COMPOUNDS BY EXTRACTS OF A METHANOGENIC BACTERIUM
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: CF
COMMENT: PUISNCING IN JAPAN AND SWEDEN
- Y-733 AUTHOR: CRAGLE, D. L. DATE: 1983-06-09
TITLE: PRELIMINARY ANALYSIS OF MORTALITY AMONG Y-12 WORKERS MONITORED FOR MERCURY (PHASE I)
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: CP
COMMENT: ORAU CENTER FOR EPIDEMIOLOGIC RESEARCH STUDY.
- Y-734 AUTHOR: WOOD, J. H. DATE: 1974-03
TITLE: BIOLOGICAL CYCLES FOR TOXIC ELEMENTS IN THE ENVIRONMENT
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: CP
COMMENT: NATURALLY OCCURRING TOXIC ELEMENTS & TOXIC COMPOUNDS THAT ARE SYNTHESIZED
- Y-735 AUTHOR: DUFFIELD, D. P. DATE: 1968
TITLE: THE MERCURY HAZARD IN INDUSTRY AND ITS CONTROL
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: CP
COMMENT:
- Y-736 AUTHOR: POSTMA, H. DATE: 1971, JANUARY 26
TITLE: MERCURY PROBLEM BUILDING 9201-2. LETTER FROM H. POSTMA TO J. H. CASE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: MERCURY-IN-HOT WATER PROBLEM
- Y-737 AUTHOR: POSTMA, H. DATE: 1971-01-08
TITLE: MERCURY CONTAMINATION, BLDG 9201-2, LETTER FROM H. POSTMA TO P. R. BRUCE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: MERCURY

1-736 AUTHOR: PCSTMIA, H. DATE: 1971-01-12
TITLE: METALLIC MERCURY VAPOUR IN BLDG 9201-2. LETTER FROM H. PCSTMIA TO J. H. CASE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT: MERCURY VAPOR, RADIATION STANDARDS

1-736 AUTHOR: EBERT, J. W. DATE: 1971-02-11
TITLE: MERCURY INCIDENT, LETTER FROM J. W. EBERT TO J. H. CASE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT: MERCURY INCIDENT IN BLDG 9201-2

1-736 AUTHOR: POSTMA, H. DATE: 1971-09-27
TITLE: MISCELLANEOUS, LETTER FROM H. POSTMA TO E. R. WELLS
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT: MERCURY VAPOR

1-736 AUTHOR: PCSTMIA, H. DATE: 1972-06-08
TITLE: MERCURY SURVEY IN BLDG 9201-2. LETTER FROM R. S. EDWARDS TO H. POSTMA
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT: MERCURY CONCENTRATION ANALYSIS

1-736 AUTHOR: LANDIS, STEVE D. DATE: 1976-03-22
TITLE: MERCURY SURVEY IN BASEMENT OF BLDG 9201-2. LETTER FROM STEVE LANDIS TO RANDALL EDWARDS
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT: MERCURY VAPOR

1-737 AUTHOR: MORROW, R. W. DATE: 1976-08-11
TITLE: MERCURY CONTENT OF FISH SAMPLES, LETTER FROM R. W. MORROW TO J. W. ELWOOD
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT: ANALYSIS OF FISH FROM POPLAR CREEK

1-737 AUTHOR: MORROW, R. W. DATE: 1976-08-24
TITLE: MERCURY CONTENT OF FISH SAMPLES, LETTER FROM R. W. MORROW TO J. W. ELWOOD
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT: ANALYSIS OF FISH FROM POPLAR CREEK AND MELTON HILL

1-737 AUTHOR: MORROW, R. W. DATE: 1976-09-16
TITLE: MERCURY CONTENT OF FISH SAMPLES, LETTER FROM R. W. MORROW TO J. W. ELWOOD
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: ANALYSIS OF FISH FROM CLINCH RIVER

1-737 AUTHOR: MORROW, R. W. DATE: 1976-11-08
TITLE: MERCURY CONTENT OF FISH SAMPLES, LETTER FROM R. W. MORROW TO J. W. ELWOOD
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: ANALYSIS OF FISH FROM MELTON HILL

1-738 AUTHOR: POOTE, ROBERT S. DATE: 1972-08-02
TITLE: MERCURY VAPOR CONCENTRATIONS INSIDE BUILDINGS, ARTICLE FROM SCIENCE
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: CP
COMMENT: SCIENCE, VOL. 177

1-739 AUTHOR: DATE: 1969-12
TITLE: MAXIMUM ALLOWABLE CONCENTRATIONS OF MERCURY COMPOUNDS, ARTICLE FROM ARCH ENVIRON HEALTH
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: CP
COMMENT: EVALUATION OF MAC VALUES FOR MERCURY AND ITS COMPOUNDS

1-740 AUTHOR: WALLACE, FOBIN A. DATE: 1971-01
TITLE: MERCURY IN THE ENVIRONMENT
SUBJECT: TECHNICAL REPORT
REPORT NUM: OFNL NSF-EP-1 CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT:

- 1-741 AUTHOR: HYG GUIDE SERIES DATE: 1966
TITLE: MERCURY AND ITS INORGANIC COMPOUNDS. ARTICLE FROM AMERICAN INDUSTRIAL HYGIENE ASSOCIATION
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: MCCUALEY, L. L.
COMMENT: RECOMMENDED MAXIMAL ATMOSPHERIC CONCENTRATIONS. TOXIC PROPERTIES.
- 1-741 AUTHOR: AMER IND HYG ASSOC DATE: 1972-04-18
TITLE: AMERICAN NATIONAL STANDARD ACCEPTABLE CONCENTRATIONS OF INORGANIC MERCURY AND NON-ALKYL ORGANS COMPOUNDS
SUBJECT: OPEN LITERATURE
REPORT NUM: ANSI CLASS: U DRAWER: 19
CUSTODIAN: MCCUALEY, L. L.
COMMENT: ACCEPTABLE AVERAGE MERCURY CONCENTRATION IN AIR. SAMPLING PROCEDURES AND ANALYTICAL METHODS. PROPERTIES OF MERCURY AND ITS COMPOUNDS.
- 1-741 AUTHOR: FEDERAL REGISTER DATE: 1972-10-18
TITLE: DEPT OF LABOR. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION. OCCUPATIONAL SAFETY AND HEALTH STANDARDS
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: MCCUALEY, L. L.
COMMENT: FEDERAL REGISTER, VOL 37, NC, 202
- 1-741 AUTHOR: NIOSH DATE: 1973
TITLE: CRITERIA FOR A RECOMMENDED STANDARD - OCCUPATIONAL EXPOSURE TO INORGANIC MERCURY
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: MCCUALEY, L. L.
COMMENT: CRITERIA FROM A RECOMMENDED STANDARD
- 1-741 AUTHOR: ACGIH DATE: 1982
TITLE: SUPPLEMENTAL DOCUMENTATION 1982, AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS INC.
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: MCCUALEY, L. L.
COMMENT: MERCURY
- 1-741 AUTHOR: ACGIH DATE: 1982
TITLE: THRESHOLD LIMIT VALUES FOR CHEMICAL SUBSTANCES IN WORK AIR ADAPTED BY ACGIH FOR 1982
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: MCCUALEY, L. L.
COMMENT: ARTICLE FROM AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS. THRESHOLD LIMIT VALUES.

- 1-742 AUTHOR: DCE DATE: 1981-08-13
TITLE: ENVIRONMENTAL PROTECTION, SAFETY, AND HEALTH PROTECTION PROGRAM FOR DOE OPERATIONS
SUBJECT: TECHNICAL REPORT
REPORT NUM: DOE 5480.1A CLASS: U DRAWER: 10
CUSTODIAN: MCCUALEY, L. L.
COMMENT: CURRENT THRESHOLD LIMIT VALUES (ACGIH) INDUSTRIAL HYGIENE.
- 1-743 AUTHOR: MCCLAIN, GAIL R. DATE: 1972-09-06
TITLE: PRELIMINARY AQUATIC SURVEY OF EAST FORK POPULAR CREEK AND BEAR CREEK, 1972
SUBJECT: TECHNICAL REPORT
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: ARENDT, J.
COMMENT: SAMPLING STATION LOCATIONS. TESTS AND PROCEDURE.
- 1-743 AUTHOR: SANDERS, M. DATE: 1972-10-18
TITLE: NEW HOPE POND DREDGING OPERATION
SUBJECT: TECHNICAL REPORT
REPORT NUM: Y-DD-128 CLASS: U DRAWER: 10
CUSTODIAN: ARENDT, J.
COMMENT: INDUSTRIAL WASTE TREATMENT. PH EQUALIZATION.
- 1-743 AUTHOR: REECE, JOHN H. DATE: 1973
TITLE: PRELIMINARY AQUATIC SURVEY OF EAST FORK POPULAR CREEK AND BEAR CREEK, 1973
SUBJECT: TECHNICAL REPORT
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: AFENDT, J.
COMMENT: SAMPLING STATION LOCATIONS. TESTS AND PROCEDURES.
- 1-743 AUTHOR: DATE: 1974
TITLE: PASSIVE MERCURY SYSTEMS FOR MERCURY EMISSION CONTROL
SUBJECT: OPEN SITE?ATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: AFENDT, J.
COMMENT: TECHNICAL FACT SHEET
- 1-743 AUTHOR: BONNER, WILLIAM P. DATE: 1976-07-26
TITLE: BEHAVIOR OF MERCURY IN SUSPENDED SOLIDS AND BOTTOM SEDIMENTS
SUBJECT: TECHNICAL REPORT
REPORT NUM: 59 CLASS: U DRAWER: 10
CUSTODIAN: ARENDT, J.
COMMENT: WATER RESOURCES RESEARCH CENTER, THE UNIVERSITY OF TENN.

- 4-743 AUTHOR: EPA DATE: 1980-10
TITLE: AMBIENT WATER QUALITY CRITERIA FOR MERCURY
SUBJECT: TECHNICAL REPORT
REPORT NUM: PB81-117699 CLASS: U DRAWER: 10
CUSTODIAN: ARENDT, J.
COMMENT: U. S. DEPT OF COMMERCE, NATIONAL TECHNICAL INFORMATION SERVICE
- 4-743 AUTHOR: VAN WINKLE, W. ET AL. DATE: 1982
TITLE: MERCURY CONTAMINATION IN EAST FORK POPLAR CREEK AND BEAR CREEK
SUBJECT: TECHNICAL REPORT
REPORT NUM: ORNL/CP-82 CLASS: U DRAWER: 10
CUSTODIAN: ARENDT, J.
COMMENT: PRELIMINARY INFORMATION ON CONCENTRATION OF MERCURY IN SEDIMENT, FISH, MOSS IN EAST FORK POPLAR CREEK AND BEAR CREEK DRAINS
AGES
- 4-744 AUTHOR: BAUMANN, W. H. DATE: 1953-10-28
TITLE: SOLVENT LOSS FROM TRAY VENT SYSTEMS, 9204-4, LETTER FROM W. H. BAUMANN TO W. K. WHITSON
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: AIR SAMPLES
- 4-744 AUTHOR: SAPIRIS, S. R. DATE: 1966-05-13
TITLE: REPORT OF INVESTIGATING COMMITTEE - LCSS OF MERCURY AT THE Y-12 PLANT, LETTER FROM S. R. SAPIRIS (AEC) TO C. E. LARSON (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: RECOMMENDATIONS OF COMMITTEE. EFFECTS OF SPILL LOSS.
- 4-744 AUTHOR: SANDERS, MERWIN DATE: 1970-J8-06
TITLE: MERCURY ANALYSIS, LETTER FROM MERWIN SANDERS TO J. D. MCLENDON
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: MERCURY CONTENT ANALYSIS
- 4-744 AUTHOR: WILCOX, W. J. DATE: 1972-06-12
TITLE: MERCURY ANALYSES OF INSECTICIDES, HERBICIDES, AND PESTICIDES
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: RUST ENG. AIKYI MERCURY PRODUCTS.

- Y-744 AUTHOR: BAXTON, T. H., JR. DATE: 1977
TITLE: ANALYSIS OF ENVIRONMENTAL AND BIOLOGICAL SAMPLES FOR MERCURY BY THE Y-12 PLANT LABORATORY
SUBJECT: TECHNICAL MEMO
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: ARENDT, J.
COMMENT: DETERMINATION OF MERCURY IN Y-12. UCC ENVIRON. ANALYSIS PROCEDURES - MERCURY
- Y-744 AUTHOR: WING, J. F. DATE: 1977-05-06
TITLE: MERCURY IN FISH IN POPLAR CREEK, LETTER FROM J. F. WING (ERDA) TO W. H. TRAVIS (SAFETY AND ENVIRON. CONTROL)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: MEETING WITH TVA'S DIVISION OF ENVIRONMENTAL PLANNING, CHATTANOOGA, TENN. SUMMARY OF RAW DATA
- Y-744 AUTHOR: GOATH, S. DATE: 1981-12-05
TITLE: ANALYSES FOR TOTAL MERCURY IN SAMPLES COLLECTED AT SITES NEAR BEAR CREEK AND EAST PORK CREEK
SUBJECT: TECHNICAL MEMO
REPORT NUM: CLASS: C DRAWER: 10
CUSTODIAN: ARENDT, J.
COMMENT: DATA BY PHONE TO SBG FOR REVIEW BY W. VANWINKLE AND/OR D. REICHLER. PROPRIETARY DATA.
- Y-744 AUTHOR: FERGUSON, N. M. DATE: 1982-08-09
TITLE: DETERMINATION OF ORGANIC MERCURY IN SEDIMENTS, LETTER FROM N. M. FERGUSON TO J. G. DORSEY
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: SEDIMENT SAMPLES. ANALYSIS RESULTS.
- Y-744 AUTHOR: NAPIER, J. M. DATE: 1982-08-18
TITLE: ADDITIONAL DATA ON CORE SAMPLES FROM NEW HOPE POND, LETTER FROM J. M. NAPIER TO W. VANWINKLE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: ANALYSIS FOR CHROMIUM, URANIUM AND FCB
- Y-744 AUTHOR: WING, J. F. DATE: 1982-10-26
TITLE: SUBMISSION OF DOE ACQUIRED DATA RELATING TO METALS, LETTER FROM J. F. WING (DOE) TO DAVID MCKINNEY (TENN. DEPT. OF PUBLIC HE
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: RAW DATA PERTAINING TO METALS AND ORGANIC LEVELS IN FISH AND SEDIMENTS

1-744 AUTHOR: HICKMAN, H. D. DATE: 1982-11-09
TITLE: ORNL REPORT NO. CF-82/257. MERCURY CONTAMINATION IN EAST PORK POPLAR CREEK AND BEAR CREEK (EFPC). LETTER FROM H. D. HICKMAN
TO G. G. FEE
SUBJECT: CORRESPONDENCE. EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: REVIEW OF RECOMMENDATIONS Y-12 RESPNSE

1-744 AUTHOR: AUERBACH, S. I. DATE: 1982-11-09
TITLE: LITERATURE SURVEY OF POPULATION DENSITY DATA FOR SELECTED SPECIES OF SPORT FISH. LETTER FROM S. AUERBACH TO LYNN PEACOCK
SUBJECT: CORRESPONDENCE. INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: SUPPLEMENT TO ORNL/CF-82/267. SEPT. 1982. (MERCURY CONTAMINATION IN EAST FORK, POPLAR CREEK, AND BEAR CREEK)

1-744 AUTHOR: FEE, G. G. DATE: 1982-12-01
TITLE: MERCURY CONTAMINATION IN EAST FORK POPLAR CREEK AND BEAR. LETTER FROM G. G. FEE (UCC) TO H. D. HICKMAN (DOE)
SUBJECT: CORRESPONDENCE. EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: ORNL/CF-82/257. RECOMMENDATIONS OF REPORT AND ACTION TAKEN.

1-744 AUTHOR: DORSEY, J. J. DATE: 1983-01-19
TITLE: ANALYSIS OF CCM TISSUE FOR TOTAL MERCURY. LETTER FROM J. G. DORSEY TO J. C. WHITE
SUBJECT: CORRESPONDENCE. INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: ANALYSIS OF ANIMAL TISSUE. CONTROL ANIMALS

1-744 AUTHOR: MCELHANEY, R. J. DATE: 1983-01-28
TITLE: ANALYSIS OF TISSUE FROM CONTRCL ANIMALS. LETTER FROM R. J. MCELHANEY TO J. C. WHITE
SUBJECT: CORRESPONDENCE. INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: ANALYSIS OF ANIMAL TISSUE

1-744 AUTHOR: MCELHANEY, R. J. DATE: 1983-03-08
TITLE: NOTICE OF NONCOMPLIANCE, Y-12 PLANT COMPLIANCE EVALUATION INSPECTION. LETTER FROM TENN. DEPT. OF PUBLIC HEALTH
SUBJECT: CORRESPONDENCE. EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: APPLICABLE POLLUTION STANDARDS. BUREAU OF NATIONAL AFFAIRS, INC.

1-744 AUTHOR: FOUTCH, JAMES L. DATE: 1983-05-09
TITLE: MEMORANDUM OF UNDERSTANDING BETWEEN DOE AND EPA AND TENN. DEPT. OF PUBLIC HEALTH
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: COMPLIANCE WITH POLLUTION CONTROL STANDARDS AT Y-12

1-744 AUTHOR: MARCIANTE, G. J. DATE: 1983-05-12
TITLE: REQUEST FOR INTERFETIVE ASSISTANCE: MERCURY IN SEDIMENTS. LETTER FROM GABRIEL J. MARCIANTE (DOE) TO ROCHESTER UNIVERSITY
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: MERCURY LEVELS. EAST FORK.

1-744 AUTHOR: CAKES, T. W. DATE: 1983-05-16
TITLE: LIFE PERIOD INFORMATION ON MERCURY. LETTER FROM T. W. OAKES TO C. R. RICHMOND
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: MERCURY RELEASES AT Y-12 AND PERTINENT DATA.

1-744 AUTHOR: BUTZ, T. F. DATE: 1983-05-16
TITLE: GROUNDWATER MONITORING DATA. LETTER FROM T. R. BUTZ TO M. L. JONES
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: SAMPLES. MERCURY CONTENT.

1-744 AUTHOR: TURNER, R. R. DATE: 1983-05-27
TITLE: ESTIMATE OF AMOUNT OF MERCURY IN THE NEW HOPE POND SEDIMENTS. LETTER FROM R. R. TURNER TO R. W. COUNTS
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: MERCURY CONCENTRATIONS

1-744 AUTHOR: STONER, H. H. DATE: 1983-06-09
TITLE: Y-12 ACTIVITIES RELATED TO MERCURY 1950-1966
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: Y-12 ACTIVITIES. ENVIRONMENTAL PROTECTION

1-744 AUTHOR: STONER, H. H. DATE: 1983-06-09
TITLE: Y-12 ACTIVITIES RELATED TO ENVIRONMENTAL PROTECTION REQUIREMENTS (1954-1968)
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: ARENDT, J.
COMMENT: ENVIRONMENTAL PROTECTION. Y-12 ACTIVITIES

1-745 AUTHOR: DATE: 1978-04-28
TITLE: TENNESSE EP. EFFLUENT LIMITATIONS AND STANDARDS
SUBJECT: OPEN LITERATURE
REPORT NUM: S-396 CLASS: U DRAWER: 19
CUSTODIAN: APENDT, J.
COMMENT: TENN. WATER QUALITY CONTROL

1-745 AUTHOR: SCHROEDER, W. H. DATE: 1982
TITLE: SMELTING AND ANALYSIS OF MERCURY AND ITS COMPOUNDS IN THE ATMOSPHERE
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: ARENDT, J.
COMMENT: TOXICOLOGY OF MERCURY AND ITS COMPOUNDS. ENVIRON. SCI. TECHNOL., VOL. 16, NO. 7

1-745 AUTHOR: DATE: 1983-01-21
TITLE: TENNESSEE WATER QUALITY CRITERIA
SUBJECT: OPEN LITERATURE
REPORT NUM: S-639 CLASS: U DRAWER: 19
CUSTODIAN: ARENDT, J.
COMMENT: RULES AND REGULATIONS OF THE STATE OF TENN.

1-745 AUTHOR: DATE: 1983-05
TITLE: LOCAL NEWS ACCOUNT'S FILE, MAY 1983
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: ARENDT, J.
COMMENT: MERCURY Y-12 EAST PORK POPLAR CREEK

1-746 AUTHOR: DATE: 1955-1956
TITLE: SOLVENT PROBLEMS - FOLDER B SOLVENT HAZARDS COMM. CORR. FILES.
SUBJECT: CORRESPONDENCE, INTERNAL
PEPCT NUM: CLASS: C DRAWER: 17
CUSTODIAN: GOOGIN, J. M.
COMMENT: AIR ANALYSIS, HG VAPORS, SCIENT LOSSES EXHAUST, ALPHA 5. DECON., DR. KEHOE VISIT TO Y-12

Y-747 AUTHOR: DATE: 1955-1956
TITLE: SOLVENT PROBLEMS - FOLDER A
SUBJECT: CORRESPONDENCE, INTERNAL

REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: GOCGIN, J. 4.
COMMENT: SHOWE STUDY, ALTAIA 4 & 5 CORR. FILES, SOLVENT VAP., ABSORBER TRAYS, SOURCE SAMPLE ANALYSIS, TEMP EFFECT ON AIR CONTAM.

Y-748 AUTHOR: DATE:
TITLE: EXISTING STANDARDS AND TOLERANCE LIMITS
SUBJECT: OPEN LITERATURE

REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: ARENDT, J.
COMMENT: MAXIMUM ALLOWABLE CONCENTRATION (MAC), AIR, WATER, FOOD

Y-748 AUTHOR: YAROTO, J. 2, DATE: 1966-09
TITLE: ADVANCES IN WATER POLLUTION RESEARCH - VOL. 3

SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: ARENDT, J.
COMMENT: ENVIRONMENTAL CONTROL

Y-748 AUTHOR: DATE: 1976-06
TITLE: QUALITY CRITERIA FOR WATER
SUBJECT: OPEN LITERATURE

REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: ARENDT, J.
COMMENT: ENVIRONMENTAL CONTROL

Y-748 AUTHOR: TSUBAKI, T. DATE: 1977
TITLE: MINAMATA DISEASE

SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: ARENDT, J.
COMMENT: METHYL MERCURY POISONING IN MINAMATA & NIIGATA, JAPAN

Y-749 AUTHOR: DATE: 1978
TITLE: AN ASSESSMENT OF MERCURY IN THE ENVIRONMENT
SUBJECT: OPEN LITERATURE

REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: ARENDT, J.
COMMENT: ENVIRONMENT CONTROL

- 4-748 AUTHOR: FRIBERG, L. DATE: 1960
TITLE: MERCURY IN THE ENVIRONMENT
SUBJECT: OPEN LITERATURE CLASS: U DPAWER: 19
REPORT NUM: CUSTODIAN: ARENDT, J.
COMMENT: EPIDEMIOLOGICAL & TOXICOLOGICAL APPRAISAL
- 4-750 AUTHOR: DATE: 1983-05-11
TITLE: HISTORY OF HANDLING EXCESS MERCURY BY THE Y-12 MATERIALS DEPARTMENT IN BLDG. 9720-26
SUBJECT: MERCURY FLASK DATA CLASS: C DRAWER: 8
REPORT NUM: CUSTODIAN:
COMMENT: HISTORY OF RECOVERY OF MERCURY BEGINNING IN 1963.
- 4-751 AUTHOR: DATE: 1954
TITLE: STANDARD PROCEDURES - COLEX OPERATING DEPT.
SUBJECT: PRODUCTION OPERATING RECORDS CLASS: C DRAWER: 12
REPORT NUM: CUSTODIAN: CF
COMMENT: FIVE-INCH THICK VOLUME CONTAINS 57 SEPARATE OPERATING PROCEDURES
- 4-752 AUTHOR: N. Y. ACADEMY OF SCI DATE: 1957-04-11
TITLE: MERCURY AND ITS COMPOUNDS
SUBJECT: OPEN LITERATURE CLASS: U DRAWER: 19
REPORT NUM: CUSTODIAN: ARENDT, J.
COMMENT: ARTICLES ON TOXICOLOGY AND PHARMACOLOGY (REPORT BY N. Y. ACADEMY OF SCIENCE)
- 4-752 AUTHOR: DATE: 1969-12
TITLE: MAXIMUM ALLOWABLE CONCENTRATIONS OF MERCURY COMPOUNDS
SUBJECT: OPEN LITERATURE CLASS: U DRAWER: 19
REPORT NUM: CUSTODIAN: CF
COMMENT: PREPARED AT A SYMPOSIUM AT THE KAROLINSKA INSTITUTE, SWEDEN. NOVEMBER 4-7, 1968
- 4-753 AUTHOR: DATE: 1955-1958
TITLE: COLEX LOSSES
SUBJECT: CORRESPONDENCE, INTERNAL CLASS: C DRAWER: 17
REPORT NUM: CUSTODIAN: SMITH, D. W.
COMMENT: COMPILATION OF INTERNAL MERCURANDA CN MERCURY LOSSES

1-754 AUTHOR: ANDERSON, J. S. DATE: 1976-11
TITLE: SAFETY ANALYSIS REPORT ON MERCURY PLASKING
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: Y/MA-5556 CLASS: U DRAWER: 10
CUSTODIAN: SMITH, D. W.
COMMENT: (ALSC M-343)

Y-754 AUTHOR: ANDERSON, J. S. DATE: 1977-12
TITLE: SAFETY ANALYSIS REPORT ON MERCURY PLASKING, PHASE II, COLUMN WASHING, WATER TREATMENT AND MERCURY BUTTER CLEANING
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: Y/MA-5556, ADD.1 CLASS: U DRAWER: 10
CUSTODIAN: SMITH, D. W.
COMMENT:

Y-755 AUTHOR: NICHOLS, ENG. DATE:
TITLE: INSTRUCTION FOR OPERATING NICHOLS HERRESHOFF MULTIPLE HEARTH FURNACE
SUBJECT: TECHNICAL REPORTS
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: SMITH, D. W.
COMMENT:

Y-755 AUTHOR: CATALYTIC CONST CO DATE: 1956-07-30
TITLE: SPECIFICATION FOR MULTIPLE-HEARTH FURNACE
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: B-7131-L-10 CLASS: U DRAWER: 10
CUSTODIAN: SMITH, D. W.
COMMENT:

Y-757 AUTHOR: COLEX DEVELOPMENT LABORATORY DATE: 1958-02-20
TITLE: COLEX DEVELOPMENT LABORATORY
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: CLASS: C DRAWER: 10
CUSTODIAN: CP
COMMENT: TABLE SHOWS CURRENT, FUTURE, AND DEFERRED EFFORTS

Y-757 AUTHOR: DEVELOPMENT DIVISION PROJECTS DATE: 1958-07-02
TITLE: DEVELOPMENT DIVISION PROJECTS
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: CF
COMMENT: DESCRIPTION OF DEVELOPMENT PROJECTS FOR ALLOY DIVISION

- 4-759 AUTHOR: CHEMICAL WEEK DATE: 1965-06-12
TITLE: MERCURY MEANS LARCENY, ARTICLE FROM CHEMICAL WEEK
SUBJECT: OPEN LITERATURE CLASS: U DRAWER: 19
REPORT NUM:
CUSTODIAN: CF
COMMENT: THEFT OF MERCURY, PRICES QUADRUPLED FROM 1963 TO 1965
- 4-760 AUTHOR: DATE:
TITLE: MERCURY STORAGE FLASKS (SPECIFICATION)
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: YS-2842 CLASS: U DRAWER: 10
CUSTODIAN: SMITH, D. W.
COMMENT:
- 4-760 AUTHOR: WILLIAMS, R. D. DATE: 1965-04-20
TITLE: MERCURY AUDIT COMMENTS, LETTER FROM R. D. WILLIAMS TO R. F. HIBBS
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT: 9201-4 AND 5 COVERED BY AUDIT
- 4-760 AUTHOR: HIBBS, P. F. DATE: 1965-05-07
TITLE: MERCURY HANDLING AT THE Y-12 PLANT, LETTER FROM R. F. HIBBS (UCC) TO C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM:
CUSTODIAN: SMITH, D. W.
COMMENT: METHODS OF PROTECTION AGAINST DIVERSION
- 4-760 AUTHOR: HOLLINGSWORTH, R. E. DATE: 1966-07-05
TITLE: LOSS OF MERCURY AT Y-12 PLANT, LETTER FROM R. E. HOLLINGSWORTH (AEC) TO S. R. SAPIRIE (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM:
CUSTODIAN: SMITH, D. W.
COMMENT: SEQUENCE OF OPERATING ERRORS, CONCERN EXPRESSED.
- 4-761 AUTHOR: LAISON, C. E. DATE: 1966-07-19
TITLE: LOSS OF MERCURY AT THE Y-12 PLANT, LETTER FROM C. E. LARSON (UCC) TO S. R. SAPIRIE (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM:
CUSTODIAN: SMITH, D. W.
COMMENT:

1-760 AUTHOR: GOLDENSON, A. P. DATE: 1968-03-04
TITLE: BUILDING 9201-4 MERCURY. LETTER FROM A. P. GOLDENSON TO W. T. CROW
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17

CUSTODIAN: SMITH, D. W.
COMMENT: PROCEDURE USED IN 1967. 9201-4 MERCURY INVENTORY
1-760 AUTHOR: RICHMOND, C. Z. DATE: 1977-06-13
TITLE: MERCURY CONTAMINATION IN POPLAR CREEK AND CLINCH RIVER SEDIMENTS. LETTER FROM C. R. RICHMOND TO J. M. CASE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17

CUSTODIAN: SMITH, D. W.
COMMENT: REFERENCE MADE TO ORNL/CP-77/320 BY J.W. ELWOOD
1-760 AUTHOR: CASE, J. M. DATE: 1978-04-07
TITLE: EXCESSING OF MERCURY FOR DISPOSAL BY GSA, LETTER FROM J. M. CASE (UCC) TO H. D. HICKMAN (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL (ALSO M-220, M-391, M-393)
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT: IN-PLACE TRANSFER TO GSA OF 7,000 FLASKS

1-760 AUTHOR: YAGGI, W. J. DATE: 1983-03-04
TITLE: MERCURY CLEANUP
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT: SUMMARY OF MEETING TO ESTABLISH ACTION PLAN

1-760 AUTHOR: WARD, G. L. DATE: 1983-05-09
TITLE: MERCURY CLEANUP, LETTER FROM G. L. WARD TO W. J. YAGGI
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT: MERCURY CLEANUP STATUS AS OF MAY 6, 1983

1-761 AUTHOR: DATE: 1982
TITLE: STANDARD INDUSTRIAL CLASSIFICATION (SIC) = 2812 ALKALIES AND CHLORINE
SUBJECT: TECHNICAL MEMO
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: DOTY, C.
COMMENT: A DIALOG SEARCH FROM THE EIS INDUSTRIAL PLANTS DATABASE

- 1-762 AUTHOR: PERRY, J. E. DATE: 1958-07-02
TITLE: MERCURY PURIFICATION, LTR FRM J. E. PERRY TO J. S. REECE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CF
COMMENT: INCLUDES TABLE OF SPECTROGRAPHIC ANALYSES
- 1-763 AUTHOR: CONNOR, J. J. DATE: 1975
TITLE: BACKGROUND GEOCHEMISTRY OF SOME ROCKS, SOILS, PLANTS, & VEGETABLES IN THE CONTINUOUS U. S.
SUBJECT: TECHNICAL REPORT
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: ARENDT, J.
COMMENT: GEOCHEMICAL SUMMARIES
- 1-763 AUTHOR: GREENWOOD, D. R. DATE: 1979-08
TITLE: A HANDBOOK OF KEY FEDERAL REGULATIONS & CRITERIA FOR MULTIMEDIA ENVIRONMENTAL CONTROL
SUBJECT: TECHNICAL REPORT
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: ARENDT, J.
COMMENT: FEDERAL ENVIRONMENTAL REGULATIONS
- 1-764 AUTHOR: LAFRANCE, L. J. DATE: 1955-12-09
TITLE: SCURVE SAMPLES FOR SOLVENT VAPOR, LETTER FROM L. J. LAPRANCE TO P. V. TILSON
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McCUALEY, L. L.
COMMENT: SAMPLES FROM 9201-4
- 1-764 AUTHOR: MITCHEL, G. W. DATE: 1955-12-23
TITLE: TEST AT BUILDING 9201-5 TO DETERMINE EFFECT OF TEMPERATURE ON AIR CONTAMINATION IN OPERATING AREAS, LETTER FROM G. W. MITCHEL
TO W.K. WHITSON, JR.
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: McCUALEY, L. L.
COMMENT:
- 1-764 AUTHOR: LAFRANCE, LEO J. DATE: 1956-01-09
TITLE: SHOWER STUDY, LETTER FROM LEC J. LAPRANCE TO W. K. WHITSON, JR.
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: McCUALEY, L. L.
COMMENT: SOLVENT VAPOR READINGS AT SKIN SURFACES BEFORE AND AFTER TAKING A SHOWER

- 1-764 AUTHOR: PERRY, J. E. DATE: 1956-02-29
TITLE: DECONTAMINATION MEMO NO. 11. RECOMMENDED HOUSEKEEPING PROCEDURE, LETTER FROM J. E. PERRY TO W. K. WHITSON
SUBJECT: COPRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: MCCUALEY, L. L.
COMMENT: PROCEDURE OUTLINED FOR HOUSEKEEPING IN ADF AREAS WHERE SOLVENT IS USED
- 1-764 AUTHOR: SAPIRE, S. P. DATE: 1956-04-23
TITLE: TOXICITY OF MERCURY. LETTER FROM S. R. SAPIRE (AEC) TO C. E. CENTER (UCC)
SUBJECT: COPRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: MCCUALEY, L. L.
COMMENT: REVIEW OF VISIT BY CONSULTANT FROM ROCHESTER UNIV.
- 1-765 AUTHOR: KLAASSEN, C. D. DATE: 1980
TITLE: CASARUTT AND DCULL'S TOXICOLOGY - THE BASIC SCIENCE OF POISONS - SECOND EDITION
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: APENDT, J.
COMMENT: POISONS
- 1-766 AUTHOR: THOMAS, L. A. DATE: 1973
TITLE: OCCUPATIONAL EXPOSURE TO INORGANIC MERCURY
SUBJECT: TECHNICAL REPORTS
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: APENDT, J.
COMMENT: EXPOSURE STANDARDS
- 1-767 AUTHOR: LEVENTHAL, J. S. DATE: 1978
TITLE: GEOLOGICAL SURVEY
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: APENDT, J.
COMMENT: TRACE ELEMENTS, CARBON, SULFUR IN KENTUCKY, W. VA AND NEW YORK
- 1-768 AUTHOR: GAFRETT, D. DATE: 1975-11
TITLE: MATERIALS BALANCE AND TECHNOLOGY ASSESSMENT OF MERCURY AND ITS COMPOUNDS ON NATIONAL AND REGIONAL BASES
SUBJECT: TECHNICAL REPORT
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: APENDT, J.
COMMENT: TOXIC NATURE OF MERCURY

1-769 AUTHOR: HILDEBRAND, S. G. DATE: 1980-08
TITLE: BIOGEOCHEMISTRY OF MERCURY IN A RIVER-RESERVOIR SYSTEM: IMPACT OF AN INACTIVE CHLORALKALI PLANT ON THE HOLSTON RIVER - CHEROKEE RESERVOIR, VA AND TN
SUBJECT: TECHNICAL REPORTS
REPORT NUM: ORNL/TM-6141 CLASS: U DRAWER: 10
CUSTODIAN: ARENDT, J.
COMMENT: BIOGEOCHEMISTRY OF MERCURY IN A RIVER RESERVOIR SYSTEM

1-770 AUTHOR: WALLACE, R. A. DATE: 1971-01
TITLE: MERCURY IN THE ENVIRONMENT - THE HUMAN ELEMENT
SUBJECT: TECHNICAL REPORT
REPORT NUM: ORNL-NSF-EP-1 CLASS: U DRAWER: 10
CUSTODIAN: ARENDT, J.
COMMENT: ENVIRONMENTAL

1-771 AUTHOR: BANNER, W. P. DATE: 1976-07
TITLE: BEHAVIOR OF MERCURY IN SUSPENDED SOLIDS AND BOTTOM SEDIMENTS
SUBJECT: TECHNICAL REPORTS
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: ARENDT, J.
COMMENT: ENVIRONMENTAL

1-771 AUTHOR: MCNEELY, R. N. DATE: 1979
TITLE: WATER QUALITY SOURCE BOOK - A GUIDE TO WATER QUALITY PARAMETERS
SUBJECT: TECHNICAL REPORTS
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: ARENDT, J.
COMMENT: WATER QUALITY

1-772 AUTHOR: WAGEN, H. V. DATE: 1964
TITLE: SOME OBSERVATIONS ON THE GEOCHEMISTRY OF MERCURY AS APPLIED TO PROSPECTING
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: ARENDT, J.
COMMENT: SOILS

1-772 AUTHOR: GAY, D. D. DATE: 1975
TITLE: BIOTRANSFORMATION & CHEMICAL FORM OF MERCURY IN PLANTS
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: ARENDT, J.
COMMENT: ENVIRONMENTAL

1-772 AUTHOR: COLWELL, R. R. DATE: 1975
TITLE: MOBILIZATION OF MERCURY BY AQUATIC MICROORGANISMS
SUBJECT: OPEN LITERATURE CLASS: U DRAWER: 19
REPORT NUM: CUSTODIAN: ARENDT, J.
COMMENT: AQUATIC MICROORGANISMS

1-772 AUTHOR: HUCKABEE, J. W. DATE: 1975
TITLE: METHYLMERCURY IN A FRESHWATER FOOD CHAIN
SUBJECT: OPEN LITERATURE CLASS: U DRAWER: 19
REPORT NUM: CUSTODIAN: ARENDT, J.
COMMENT: MERCURY UPTAKE IN A FRESHWATER FOODCHAIN

1-772 AUTHOR: ELWOOD, J. W. DATE: 1977-06
TITLE: MERCURY CONTAMINATION IN POPLAR REED AND CLINCH RIVER
SUBJECT: OPEN LITERATURE CLASS: U DRAWER: 19
REPORT NUM: CUSTODIAN: ARENDT, J.
COMMENT: ARENDT, J.

1-772 AUTHOR: GOLDRABEN, G. R. DATE: 1978-07
TITLE: AN ASSESSMENT OF MERCURY EMISSIONS FROM FOSSIL FUELED POWER PLANTS
SUBJECT: TECHNICAL REPORTS CLASS: U DRAWER: 10
REPORT NUM: EPA-60/7-78-146 CUSTODIAN: ARENDT, J.
COMMENT: HEALTH & ENVIRONMENTAL

1-772 AUTHOR: WATER QUALITY SOURCEBOOK - A GUIDE TO WATER QUALITY PARAMETERS
TITLE: WATER QUALITY SOURCEBOOK - A GUIDE TO WATER QUALITY PARAMETERS
SUBJECT: OPEN LITERATURE CLASS: U DRAWER: 19
REPORT NUM: CUSTODIAN: ARENDT, J.
COMMENT: WATER QUALITY GUIDE LINES

1-772 AUTHOR: PRITZ, P. M. DATE: 1982-11
TITLE: SPILL - PREVENTION CONTROL & COUNTERMEASURE (SPCC) PLAN FOR OIL AND HAZARDOUS SUBSTANCES AT THE OAK RIDGE Y-12 PLANT
SUBJECT: TECHNICAL REPORTS CLASS: U DRAWER: 10
REPORT NUM: CUSTODIAN: ARENDT, J.
COMMENT: POLLUTION CONTROL MEASURES

- 1-773 AUTHOR: BUSTAMANTE, R. B. DATE: 1983
TITLE: PRELIMINARY REPORT, DECONTAMINATION RECOMMENDATION OF BUILDING 9201-4
SUBJECT: OPEN LITERATURE REPORT
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: ARENDT, J.
COMMENT: METHODS & PROCEDURES TO DECONTAMINATE 9201-4
- 1-773 AUTHOR: DATE: 1983-05
TITLE: LITERATURE INFORMATION ON MERCURY
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: ARENDT, J.
COMMENT: CONCENTRATION IN SEDIMENTS OF RIVERS & STREAMS
- 1-774 AUTHOR: GRDENIC, D. DATE: 1968
TITLE: HANDBOOK OF GEOCHEMISTRY - MERCURY
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: ARENDT, J.
COMMENT:
- 1-774 AUTHOR: FLEISCHER, M. DATE: 1970
TITLE: MERCURY IN THE ENVIRONMENT
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: ARENDT, J.
COMMENT: ANALYSIS OF SOILS AND SEDIMENTS
- 1-774 AUTHOR: HILDEBRAND, S. G. DATE: 1980-10
TITLE: DISTRIBUTION OF MERCURY IN THE ENVIRONMENT AT ALMADEN, SPAIN
SUBJECT: TECHNICAL REPORTS
REPORT NUM: ORNL-TM-7446 CLASS: U DRAWER: 10
CUSTODIAN: APENDT, J.
COMMENT: ECOLOGICAL SURVEY OF CONCENTRATION & DISTRIBUTION IN TERRESTRIAL & AQUATIC SYSTEMS
- 1-775 AUTHOR: DATE: 1971
TITLE: MONITORING MERCURY VAPOR NEAR POLLUTION SITES
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: ARENDT, J.
COMMENT: MONITORING VAPOR IN AIR

1-775 AUTHOR: SCHROEDER, W. H. DATE: 1979
TITLE: SAMPLING AND ANALYTICAL METHODOLOGY FOR MERCURY AND ITS COMPOUNDS IN AIR
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: ARENDT, J.
COMMENT: MONITORING CN AIR

1-775 AUTHOR: SCHROEDER, W. H. DATE: 1979-11
TITLE: PRELIMINARY EVALUATION OF TWO MERCURY MCNITORS UNDER FIELD CONDITIONS
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: ARENDT, J.
COMMENT: MONITORING AND EVALUATIONS

1-775 AUTHOR: KAISER, G. DATE: 1980
TITLE: THE HAND BOOK OF ENVIRONMENTAL CHEMISTRY - VOL. 3 PART A
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: ARENDT, J.
COMMENT: ENVIRONMENTAL AND TOXICOLOGICAL CHEMISTRY

1-775 AUTHOR: FAUST, S. D. DATE: 1981
TITLE: MERCURY, ARSENIC, LEAD, CADMIUM, SELENIUM AND CHROMIUM IN AQUATIC ENVIRONMENTS
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: ARENDT, J.
COMMENT: HEAVY METALS IN THE AQUATIC ENVIRONMENTS

1-776 AUTHOR: HANIG, M. DATE: 1956-04-09
TITLE: OPERATION OF ADP FACILITIES FOR FEDUCED PRODUCTION, LETTER FROM M. HANIG TO J. P. MURRAY
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: KOA-103 CLASS: S DRAWER: 17
CUSTODIAN: CP
COMMENT:

1-777 AUTHOR: KITE, H. T. DATE: 1955-10-19
TITLE: ALPHA-5 FLOODING EXPERIMENT, LETTER FROM H. P. KITE TO H. C. MCBIRNEY
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: Y-BE5-69 CLASS: S DRAWER: 17
CUSTODIAN: CP
COMMENT:

4-778 AUTHOR: DATE: 1955-11-11
TITLE: SPECIFICATIONS FOR SCLVEX PUMES-PRANE
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: Y-B65-73 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

4-779 AUTHOR: DATE: 1982
TITLE: STANDARD INDUSTRIAL CLASSIFICATION (SIC) = 2812 ALKALIES AND CHLORINE
SUBJECT: TECHNICAL MEMO
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: DOTY, C.
COMMENT: A DIRLOG SEARCH FROM THE EYE-MANUFACTURERS DIRECTORY

4-780 AUTHOR: DATE: 1954-1983
TITLE: MERCURY BOTTLING, ISSUES, TRANSFERS, AND LOSSES (1954-1983)
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: MCCOLLUM, H. V.
COMMENT: COMPIRATION OF DATA ON MERCURY TRANSFERS, BOTTLING, ISSUES, USAGE, HANDLING, INVENTORY, SLUDGE, LOSSES, AND ACCOUNTABILITY RECORDS

4-781 AUTHOR: DATE: 1965
TITLE: STRIPPING OF 9201-5
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: DOTY, C. D.
COMMENT: MISCELLANEOUS CORRESPONDENCE, MAINTENANCE WORK REQUESTS, SAFETY RECOMMENDATIONS, AND LISTS OF EMPLOYEES ON THE PROJECT

4-781 AUTHOR: MINCHEW, J. W. DATE: 1965-05-28
TITLE: BUILDING 9201-5 STRIPPING, LETTER FRM J. W. MINCHEW TO D. A. JENNINGS
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: DOTY, C. D.
COMMENT: STRIPPING OF 9201-5 WAS BEGUN MARCH 29, 1965. (ALSO H-392)

4-781 AUTHOR: DATE: 1965-1978
TITLE: INVITATION, BID AND ACCEPTANCE FOR SALE OF CONTAMINATED MERCURY (1965-1978)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: DOTY, C. D.
COMMENT: EQUIPMENT AND PARTS CONTAMINATED WITH MERCURY OFFERED FOR SALE

1-781 AUTHOR: SMITH, D. W. DATE: 1966-04-12
TITLE: MERCURY RECOVERY SETTING. LETTER FROM D. W. SMITH TO R. D. WILLIAMS
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: DOTY, C. D.
COMMENT: REPORT OF EXPLORATION FOR MERCURY IN 9201-5 PAN ROOM F

1-783 AUTHOR: CENTER, C. E. DATE: 1952-04-25
TITLE: MERCURY FOR ALLOY DEVELOPMENT PLANT. LETTER FROM C. E. CENTER (UCC) TO S. R. SAPIRIE (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: KA-254 CLASS: S DRAWER: 17
CUSTODIAN: CF
COMMENT: REQUEST FOR FIRM COMMITMENT FROM GSA FOR UCN'S MERCURY REQUIREMENT

1-783 AUTHOR: CENTER, C. E. DATE: 1952-09-08
TITLE: MERCURY FOR ALLOY DEVELOPMENT PLANT. LETTER FROM C. E. CENTER (UCC) TO S. R. SAPIRIE (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: KA-282 CLASS: S DRAWER: 17
CUSTODIAN: CF
COMMENT: ESTIMATE OF REQUIREMENTS OF PRIME VIRGIN MERCURY FOR ADP

1-783 AUTHOR: CENTER, C. E. DATE: 1952-10-10
TITLE: MERCURY FOR OREX ADP PROCESS DEVELOPMENT. LETTER FROM C. E. CENTER (UCC) TO S. R. SAPIRIE (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: KA-286 CLASS: S DRAWER: 17
CUSTODIAN: CF
COMMENT: REQUIREMENTS OF PRIME VIRGIN MERCURY FOR ELEX PLANT.

1-783 AUTHOR: CENTER, C. E. DATE: 1953-03-18
TITLE: MERCURY FOR ALLOY DEVELOPMENT PLANT. LETTER FROM C. E. CENTER (UCC) TO S. R. SAPIRIE (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: KA-309 CLASS: S DRAWER: 17
CUSTODIAN: CF
COMMENT: AMOUNTS OF MERCURY NEEDED FOR ELEX AND OREX PLANTS WITH YEARLY RATES OF USAGE.

1-783 AUTHOR: SAPIRIE, S. P. DATE: 1953-06-18
TITLE: FUTURE ADP SOLVENT REQUIREMENTS. LETTER FROM S. R. SAPIRIE (AEC) TO W. B. HUNES (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: OEC-33295 CLASS: S DRAWER: 17
CUSTODIAN: CF
COMMENT: QUANTITIES OF MERCURY TO BE SHIPPED BY GSA.

- 4-783 AUTHOR: HUMES, W. B. DATE: 1953-07-14
TITLE: PUTURE ADP SOLVENT EQUIPMENT, LETTER FROM W. B. HUMES (UCC) TO S. R. SAPIRIE (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: KB-421 CLASS: S DRAWER: 17
CUSTODIAN: CF
COMMENT: MERCURY DISTRIBUTION (ON HAND AND IN SYSTEM)
- 4-783 AUTHOR: JACKSON, L. H. DATE: 1955-07-20
TITLE: ALPHA-5 PROJECT SOLVENT COSTS, LTR FRM L. H. JACKSON (AEC) TO S. R. SAPIRIE (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: ORO-71298 CLASS: S DRAWER: 17
CUSTODIAN: DCE ENGINEERING DIVISION
COMMENT: REVIEWS MERCURY SOURCE, CGST, AND PROCUREMENT FOR ALPHA-5 PROJECT
- 4-783 AUTHOR: HICKMAN, H. D. DATE: 1974-06-28
TITLE: MERCURY PURCHASES AND SALES, LETTER FROM H. D. HICKMAN (AEC) TO D. K. GESTON (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: AKIN, J. T.
COMMENT: HISTORY OF OAK RIDGE MERCURY ACTIVITIES, 1950-1973. (ALSO H-477)
- 4-783 AUTHOR: DATE: 1974-09-12
TITLE: MEMORANDUM NO. 6 TO MEMORANDUM OF AGREEMENT BETWEEN GSA FEDERAL SUPPLY SERVICE AND THE USAEC
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: GS-00P-23195 CLASS: U DRAWER: 17
CUSTODIAN: AKIN, J. T.
COMMENT: STORAGE AND HANDLING OF MERCURY AND LITHIUM
- 4-784 AUTHOR: SMITH, D. W. DATE: 1965-01-18
TITLE: MERCURY PACKAGING PROCEDURE, LETTER PGFM D. W. SMITH TO R. D. WILLIAMS
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: INCLUDES SYSTEMATIC PLAN FOR PATROLLING MERCURY STORAGE AREAS
- 4-784 AUTHOR: KELLER, C. A. DATE: 1965-05-25
TITLE: PLASKING MERCURY, LETTER FROM C. A. KELLER (AEC) TO R. F. HIBBS (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: GSA TO DISPOSE OF SURPLUS MERCURY.

1-784 AUTHOR: KELLER, C. A. DATE: 1965-10-22
TITLE: PLASKING MERCURY, LETTER FROM C. A. KELLER TO R. F. HIBBS
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: MERCURY TO BE RELEASED AS EXCESS TO GSA

1-784 AUTHOR: SAPIRIE, S. R. DATE: 1966-06-22
TITLE: ACCIDENTAL LOSS OF MERCURY AT Y-12, LETTER FROM S. R. SAPIRIE (AEC) TO C. E. LARSON (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: WRITE-OFF INSTRUCTIONS GIVEN.

1-784 AUTHOR: CASE, J. M. DATE: 1968-02-09
TITLE: PLASKING MERCURY, LETTER FROM J. M. CASE (UCC) TO C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: PLANS FOR WITHDRAWAL OF MERCURY FROM ALPHA-4

1-784 AUTHOR: KELLER, C. A. DATE: 1968-03-05
TITLE: PLASKING OF MERCURY, LETTER FROM C. A. KELLER (AEC) TO J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: APPROVAL TO FLASK MERCURY STILL IN THE PROCESS SYSTEM

1-784 AUTHOR: CASE, J. M. DATE: 1968-09-26
TITLE: MERCURY INVENTORY LOSS, LETTER FROM J. M. CASE (UCC) TO C. A. KELLER (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: EARLY ESTIMATES OF LOSSES WERE UNDERSTATED. (ALSO #760)

1-784 AUTHOR: KELLER, C. A. DATE: 1968-11-14
TITLE: MERCURY INVENTORY LOSS, LETTER FROM C. A. KELLER (AEC) TO J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: SHORTAGE OF MERCURY AND AMOUNT AUTHORIZED TO BE WRITTEN OFF.

- 1-784 AUTHOR: KELLER, C. A. DATE: 1969-09-30
TITLE: MERCURY TO BE RELEASED TO GSA, LETTER FROM C. A. KELLER (AEC) TO J. H. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: HOPPE, W. C.
COMMENT: AUTHORIZATION FOR FLASKING CP MERCURY FOR TRANSFER TO GSA
- 1-785 AUTHOR: CASE, J. " DATE: 1977-06-09
TITLE: MERCURY INVENTORY AT Y12 PLANT 1950 THROUGH 1977, LETTER FROM J. H. CASE (UCC) TO H. D. WICKMAN (ERDA)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: Y/AD-428 CLASS: S DRAWER: 17
CUSTODIAN: SMITH, D.
COMMENT: (ALSO H-369)
- 1-786 AUTHOR: DATE: 1950-1954
TITLE: CHRONOLOGY OF ADP DEVELOPMENT PROGRAM
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: CLASS: C DRAWER: 10
CUSTODIAN: CP
COMMENT: MAJOR EVENTS DURING 1950-54 ARE LISTED.
- 1-786 AUTHOR: ZANOLLI, G. F. DATE: 1979-07
TITLE: TRANSCRIPT OF VIDEO TAPE: INTERVIEW WITH DR. MICHAEL D. UTIDIJAN
SUBJECT: TECHNICAL MEMO
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: CF
COMMENT: INTERVIEW WITH MAJOR AUTHOR OF MERCURY CRITERIA DOCUMENT FOR NIOSH
- 1-786 AUTHOR: LAPRANCE, LEO DATE: 1983-05-31
TITLE: INTERVIEW WITH LEO LAPRANCE MAY 31, 1983
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT:
- 1-786 AUTHOR: SANDERS, M. DATE: 1983-06
TITLE: INTERVIEW WITH MERWYN SANDERS ON BETA-4 PROCESS
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-786 AUTHOR: FOLLEY, DANIEL B. DATE: 1983-06-03
TITLE: STATEMENT OF INTERVIEW WITH MR. DANIEL B. FOLLEY CONCERNING GSA MERCURY RECEIVED AT Y-12 PLANT
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: CF
COMMENT:

1-786 AUTHOR: EVANS, GEORGE W. DATE: 1983-06-03
TITLE: INTERVIEW WITH GEORGE W. EVANS REGARDING SPILL ON DECEMBER 31, 19⁵⁵
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: CF
COMMENT:

1-787 AUTHOR: CENTER, C. E. DATE: 1956-05-08
TITLE: SHUTDOWN OF BETA-4, LETTER FROM C. E. CENTER (UCC) TO S. R. SAPIRIE (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: KA-455 CLASS: S DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT:

1-787 AUTHOR: MURRAY, J. P. DATE: 1956-08-02
TITLE: SECURITY CLASSIFICATION, BETA-4 DISMANTLING, LETTER FROM J. P. MURRAY (UCC) TO R. C. ARMSTRONG (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: ORO-81593 CLASS: U DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT:

1-787 AUTHOR: SAPIRIE, S. R. DATE: 1956-10-04
TITLE: BETA-4 PLANT DISMANTLEMENT, LETTER FROM S. R. SAPIRIE (AEC) TO C. E. CENTER (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: ORO-81593 CLASS: S DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT:

1-787 AUTHCP: CENTER, C. E. DATE: 1956-10-15
TITLE: SOLVENT AVAILABLE, LETTER FROM C. E. CENTER (UCC) TO S. R. SAPIRIE (AEC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: KA-479 CLASS: S DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT: DETAILED ACCOUNT OF MERCURY USED IN BETA-4

4-787 AUTHOR: NICELY, J. W. DATE: 1957-06-11
TITLE: REMOVAL OF MERCURY FROM NITRIC ACID WASH SOLUTIONS. LETTER FROM J.W. NICELY TO D.A. JENNINGS
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CE
COMMENT: PROCEDURE FOR 1-STAGE FEMCVL PROCESS

4-787 AUTHOR: PERRY, J. E. DATE: 1958-07-02
TITLE: MERCURY PURIFICATION, LETTER FROM J.E. PERRY TO J.S. REECE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP
COMMENT: EFFECTS OF IMPURITIES IN THE COLEX PROCESS

4-787 AUTHOR: DEFENDER, V. DATE: 1959-05-15
TITLE: 31-IN OPERATIONS ON SOLVENT-CONTAMINATED DIRT, LETTER FROM V. DEFENDER TO J.S. REECE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT: SUMMARY OF OWN ON SOLVENT RECOVERY FROM DIRT EXCAVATED FROM 9201-2 GROUNDS

4-787 AUTHOR: HICKMAN, H. D. DATE: 1976-04-08
TITLE: SAFETY ANALYSIS AND PREOPERATIONAL REVIEW OF ALPHA-4 MERCURY FLASKING, LETTER FROM H. D. HICKMAN (ERDA) TO J. M. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT:

4-788 AUTHOR: DATE: 1959-1960
TITLE: PURIFIED FEED
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: CLASS: C DRAWER: 10
CUSTODIAN: SMITH, D. W.
COMMENT: COMPILATION OF WEEKLY COMPOSITE ANALYSES AND LABORATORY RESULTS

4-789 AUTHOR: EVANS, G. W. DATE: 1956-12-29
TITLE: SUPERFICIAL STUDY OF PINE-DAY OPERATION OF ALPHA-5, LETTER FROM G.W. EVANS TO FILE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: Y-P46-24 CLASS: S DRAWER: 17
CUSTODIAN: CP
COMMENT:

M-790 AUTHOR: DATE: 1953-05-07
TITLE: PROCESS SPECIFICATIONS: NORMAL ALLOY
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: Y-C3-15 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-791 AUTHOR: DATE: 1953-09-01
TITLE: PROCESS SPECIFICATIONS: NORMAL ALLOY
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: Y-C3-17 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-793 AUTHOR: SPIEGEL, CHARLES J. DATE: 1956-11-06
TITLE: THE INDUSTRIAL HYGIENE AND TOXICOLOGY OF MERCURY (UNIVERSITY OF ROCHESTER)
SUBJECT: OPEN LITERATURE
REPORT NUM: UF-469 CLASS: U DRAWER: 19
CUSTODIAN: McCaulley, L. L.
COMMENT: THE PROBLEM OF MERCURY POISONING IS REVIEWED

Y-793 AUTHOR: ROTHSTEIN, ASER DATE: 1956-11-15
TITLE: CHRONIC MERCURY POISONING: AN EVALUATION OF OUR PRESENT KNOWLEDGE (UNIVERSITY OF ROCHESTER)
SUBJECT: OPEN LITERATURE
REPORT NUM: UF-468 CLASS: U DRAWER: 19
CUSTODIAN: McCaulley, L. L.
COMMENT: THE PROBLEM OF CHRONIC MERCURY POISONING IS REVIEWED

Y-794 AUTHOR: DATE: 1954-04-22
TITLE: ENERGY BALANCE SUMMARY AT MAXIMUM DECOMPOSITION RATE
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: Y-C4-2 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT: TABLE SHOWS PHYSICAL OPERATING CHARACTERISTICS

Y-795 AUTHOR: DATE: 1954-04-22
TITLE: ALPHA A-5 CASCADE DECOMPOSER
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: Y-C4-1 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT: DETAILED DESCRIPTION INCLUDES SKETCHES

1-796 AUTHOR: BAUMANN, W. H. DATE: 1953-08-26
TITLE: SOLVENT URINE PROGRAM, ALLOY DIVISION, LETTER FROM W. H. BAUMANN TO C. R. KASPEREK
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: URINALYSIS FLANS DETAILED

1-796 AUTHOR: BAUMANN, W. H. DATE: 1954-01-21
TITLE: SOLVENT URINE PROGRAM FOR MAINTENANCE PERSONNEL, LETTER FROM W. H. BAUMANN TO A. A. GROPP
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DFAWER: 17
CUSTODIAN: CF
COMMENT: URINALYSIS PROGRAM ESTABLISHED FOR MAINTENANCE PERSONNEL IN 9201-2 AND 9204-4

1-796 AUTHOR: GOOGIN, J. M. DATE: 1955-05-12
TITLE: REPORT OF THE COMMITTEE ON ALPHA-5 CCATAMINATION, LETTER FROM J.M. GOOGIN TO W.K. WHITSON, JR.
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: SURVEY OF HEALTH-AFFECTING FACTORS IN ALPHA-5

1-796 AUTHOR: SCURVE SAMPLES FOR SOLVENT VAPOR, LETTER TO F. V. TILSON
TITLE: SCURVE SAMPLES FOR SOLVENT VAPOR, LETTER TO F. V. TILSON
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: 9-PAGE LIST OF SAMPLES TAKEN IN 9201-4

1-796 AUTHOR: MITCHEL, G. W. DATE: 1955-12-23
TITLE: TEST AT BLDG 9201-5 TO DETERMINE EFFECT OF TEMPERATURE ON AIR CONDITIONING IN OPERATING AREAS, LETTER FROM G.W. MITCHEL TO W.
K. WHITSON, JR.
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DFAWER: 17
CUSTODIAN: CP
COMMENT: FACTORS IN AIR TEMPERATURE REDUCTION

1-796 AUTHOR: MURRAY, J. P. DATE: 1956-01-03
TITLE: REQUEST FOR Y-12 PERSONNEL TO VISIT OLIN MATHIESON, LETTER FROM J.P. MURRAY (UCC) TO W.C. GARDNER (OLIN MATHIESON)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: ASKS INFORMATION ON OLIN MATHIESON'S EXPERIENCE WITH MERCURY CONTAMINATION

4-796 AUTHOR: LAFFANCE, LEO J. DATE: 1956-01-09
TITLE: SHOWER STUDY, LTR FROM LEO J. LAFFANCE TO W.K. WHITSON, JR.
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP
COMMENT: SOLVENT VAPOR READINGS AT SKIN SURFACE

4-796 AUTHOR: KITE, H. T. DATE: 1956-04-05
TITLE: SPECIFICATION FOR MERCURY VAPOR RESPIRATORS, LETTER FROM H. T. KITE TO J. W. EBERT
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN:
COMMENT:

4-796 AUTHOR: PERRY, J. E. DATE: 1956-04-16
TITLE: THE USE OF PLOOF SEALERS AND WAXES IN THE ADP BUILDINGS, LETTER FROM J. E. PERRY TO H. C. BAYS
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT:

4-796 AUTHOR: DATE: 1956-11-30
TITLE: Y-12 DEVELOPMENT ACTIVITIES, LTR TO H. C. MOORE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: EFFORTS INCLUDE CONTROL OF MERCURY CONTAMINATION OF THE AIR

4-796 AUTHOR: REECE, JOHN S. DATE: 1957-10-24
TITLE: SUGGESTED STUDIES FOR DEVELOPMENT DIVISION, LTR FROM J. S. REECE TO R. A. WALKER
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: INTENSIVE STUDY SUGGESTED ON REDUCING MERCURY LOSSES TO THE CREEK

4-796 AUTHOR: HORDE, G. WILSON DATE: 1973-09-27
TITLE: AUTHORIZATION FOR ACCESS TO Y-12 URINARY MERCURY BIOASSAY DATA
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: INFORMATION REQUESTED BY DR. BELL

Y-796 AUTHOR: HICKMAN, H. D. DATE: 1976-04-08
TITLE: SAFETY ANALYSIS AND PREOPERATIONAL REVIEW OF ALPHA-4 MERCURY PLASKING OPERATION. LETTER FROM H. D. HICKMAN (ERA) TO J. H. CA
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT: Y-12 TC DOCUMENT SAFETY ANALYSIS OF MERCURY HANDLING OPERATION. (ALSO H-391, -422)

Y-796 AUTHOR: HICKMAN, H. D. DATE: 1977-01-07
TITLE: PREOPERATIONAL REVIEW - MERCURY FLASKING. LETTER FROM H. D. HICKMAN (ERA) TO J. H. CASE (UCC)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CF
COMMENT: SAFETY PROVISIONS CONTAINED IN Y/MA-5556 ADEQUATE

Y-797 AUTHOR: MARROW, GEORGE B. DATE: 1954-10-13
TITLE: RESULTS OF VENT GAS FILTER TESTS - BEAT-4 ELEX PLANT. LETTER FROM GEORGE B. MARROW TO L.P. TWICHELL
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: CP
COMMENT: STUDY OF FILTER EFFICIENCY

Y-798 AUTHOR: BAUMANN, W. H. DATE: 1953-10-28
TITLE: SOLVENT LOSS FROM TAY VENT SYSTEM. 9204-4, LETTER FROM W.H. BAUMANN TO W.K. WHITSON
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: AIR SAMPLES

Y-799 AUTHOR: DATE: 1973-03-28
TITLE: CLASSIFICATION GUIDANCE CONCERNING LITHIUM HYDROXIDE AND LITHIUM CHLORIDE
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-CG-606 CLASS: C DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-799 AUTHOR: DATE: 1973-03-28
TITLE: CLASSIFICATION GUIDANCE CONCERNING MERCURY
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-CG-606 CLASS: C DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-799 AUTHOR: DATE: 1973-03-28
TITLE: GLOSSARY TO LITHIUM CLASSIFICATION GUIDANCE
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-CG-601 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-799 AUTHOR: DATE: 1973-03-28
TITLE: CLASSIFICATION GUIDANCE CONCERNING LITHIUM PREPARATION (CONVERSION PROCESS)
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-CG-605 CLASS: C DRAWER: 10
CUSTODIAN: CF
COMMENT:

Y-799 AUTHOR: DATE: 1973-03-28
TITLE: CLASSIFICATION GUIDANCE CONCERNING LITHIUM PRODUCTION RATES, QUANTITIES, AND COSTS
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-CG-610 CLASS: C DRAWER: 10
CUSTODIAN: CF
COMMENT:

Y-799 AUTHOR: DATE: 1973-03-28
TITLE: CLASSIFICATION GUIDANCE CONCERNING LITHIUM SALT PRODUCTION AND FABRICATION
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-CG-603 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-799 AUTHOR: DATE: 1973-03-28
TITLE: INTRODUCTION TO LITHIUM CLASSIFICATION GUIDANCE
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-CG-600 CLASS: U DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-799 AUTHOR: DATE: 1973-03-28
TITLE: CLASSIFICATION GUIDANCE CONCERNING DEUTERIUM AND HEAVY WATER
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-CG-607 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

1-799 AUTHCR: DATE: 1973-03-28
TITLE: CLASSIFICATION GUIDANCE CONCERNING LITHIUM-7 PROGRAM (MARBLE)
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-CG-609 CLASS: C DRAWER: 10
CUSTODIAN: CF
COMMENT:

Y-799 AUTHOR: DATE: 1973-05-02
TITLE: CLASSIFICATION GUIDANCE CONCERNING LITHIUM MATERIAL
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-CG-602 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-799 AUTHOR: DATE: 1974-J4-22
TITLE: CLASSIFICATION GUIDANCE CONCERNING LITHIUM ISOTOPE SEPARATION
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y-CG-604 CLASS: C DRAWER: 10
CUSTODIAN: CP
COMMENT:

Y-800 AUTHOR: DOW, N. DATE: 1966-09-06
TITLE: COLEX, SOLVENT INVENTORY, LETTER FROM N. DOW TO H. P. SCHWENN
SUBJECT: SPECIALIST'S FILES
REPORT NUM: CLASS: C DRAWER: 10
CUSTODIAN: SMITH, D. W.
COMMENT: ALPHA-4.

Y-801 AUTHOR: DATE: 1973-1975
TITLE: COMPILATION OF MERCURY-RELATED CORRESPONDENCE
SUBJECT: CORRESPONDENCE, EXTERNAL AND INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT: QUALITY OF MERCURY SOLD. REPLASKING GSA MATERIAL. LEAKING PLASKS. BOTTLING COSTS

1-902 AUTHCR: EVANS, G. W. DATE: 1957-08-09
TITLE: COMPILATION OF MERCURY-RELATED CORRESPONDENCE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT: SOLVENT INVENTORY

- 4-803 AUTHOR: DATE: 1957-1974
TITLE: COMPILATION FILE OF MERCURY-RELATED CORRESPONDENCE
SUBJECT: CORRESPONDENCE, EXTERNAL AND INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: SMITH, D. W.
COMMENT: INVENTORY 81-10. 9201-5. HISTORY OF MERCURY ACTIVITIES.
- 4-804 AUTHOR: BAUMANN, W. H. DATE: 1954-08-09
TITLE: ALLOY-AIR CONTAMINATION - ASPEN SHOP, LETTER FROM W.H. BAUMANN TO J.H. CASE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: CONSIDERATION OF INHALATION AND DERMATOLOGICAL HAZARDS
- 4-805 AUTHOR: CHANG, L. W. DATE: 1982-09
TITLE: PROTECTIVE EFFECTS OF SELENIUM AGAINST METHYLMERCURY NEUROTOXICITY: A MORPHOLOGICAL AND BIOCHEMICAL STUDY
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: WILCOX, W. J.
COMMENT: ARTICLE TAKEN FROM EXPERIMENTAL PATHOLOGY VOL. 23 1983
- 4-806 AUTHOR: LAFRANCE, LEO J. DATE: 1955-06-27
TITLE: ALLOY CONCENTRATIONS IN AIR IN MACHINE SHOP AT BLDG 9204-2, LETTER FROM LEC J. LAFRANCE TO J.H. CASE
SUBJECT: HEALTH RECORDS
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN: CF
COMMENT:
- 4-806 AUTHOR: LAFRANCE, LEC J. DATE: 1955-06-27
TITLE: ALLOY AIR CONCENTRATIONS IN BLDG 9204-2, LETTER FROM LEC J. LAFRANCE TO W.K. WHITSON, JR.
SUBJECT: HEALTH RECORDS
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN: CF
COMMENT:
- 4-806 AUTHOR: LAFRANCE, LEO J. DATE: 1955-08-18
TITLE: STACK SAMPLES AT 9201-4, LETTER FROM LEC J. LAFRANCE TO D.A. JENNINGS
SUBJECT: HEALTH RECORDS
REPORT NUM: CLASS: C DRAWER: 13
CUSTODIAN: C
COMMENT: SAMPLING TO EVALUATE LOSSES IF VENTILATION INCREASED

1-806 AUTHOR: LAPRANCE, LEO J. DATE: 1955-08-19
TITLE: STACK SAMPLES AT 9201-4, LETTER FROM LEO J. LAPRANCE TO D.A. JENNINGS
SUBJECT: HEALTH RECORDS
REPORT NUM: CLASS: C DRAWER: 13
CUSTODIAN: CP
COMMENT:

1-806 AUTHOR: BOLTON, NEWELL E. DATE: 1956-02-09
TITLE: AIR ANALYSIS, LETTER FROM NEWELL E. BOLTON TO J.L. WILLIAMS
SUBJECT: HEALTH RECORDS
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN: CP
COMMENT: SAMPLING OF BLENDING AND MOLDING OPERATION, 9204-2

1-808 AUTHOR: LAPRANCE, L. J. DATE: 1955 - 1957
TITLE: ALLOY AIR ANALYSIS
SUBJECT: HEALTH RECORDS
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN: CP
COMMENT: COMPILATION OF AIR ANALYSES, 9201-5

1-808 AUTHOR: LAPRANCE, L. J. DATE: 1956 - 1957
TITLE: ALLOY ABSORPTION SAMPLES
SUBJECT: HEALTH RECORDS
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN: CP
COMMENT: COMPILATION OF AIR ANALYSES, 9201-5

1-809 AUTHOR: LAPRANCE, L. J. DATE: 1955 - 1957
TITLE: ALLOY STACK SAMPLES
SUBJECT: HEALTH RECORDS
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN: CP
COMMENT: COMPILATION OF AIR ANALYSES, 9201-4

1-810 AUTHOR: JASNY, G. R. DATE: 1953-07-07
TITLE: MINUTES OF MEETING ON CHEMICAL RECOVERY IN ADP
SUBJECT: TECHNICAL MEMOS
REPORT NUM: CLASS: C DRAWER: 10
CUSTODIAN: CP
COMMENT: MAJOR EFFORT TO CLEAN PROCESS EQUIPMENT, RECOVER SOLVENT OXIDE AND ALLOY HYDROXIDE

M-807 Author: G. R. Morehead Date: ~~3-1-57~~ 3-1-57
Title: H-12 Analysis
Subject: Newell Records
Report num: Class: S Drawer: 13
Custodian: CP

- 1-811 AUTHOR: EFFECTS OF MERCURY ON CELLULAR SYSTEMS IN MAMMALS - A REVIEW
SUBJ/BCT: OPEN LITERATURE DATE: 1982-12
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: WILCOX, W. J.
COMMENT: ARTICLE TAKEN FROM THE NUCLCUS AN INTERNATIONAL JOURNAL OF CYTOLOGY & ALLIED TOPICS
- 1-812 AUTHOR: STRASSER, G. A. DATE: 1954-01-14
TITLE: SCOPE OF COLEX DEVELOPMENT FACILITIES, LTR FROM G.A. STRASSER TO G.W. MITCHEL
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: CP
COMMENT: DETAILED DEVELOPMENT PLAN AND SCHEDULE
- 1-813 AUTHOR: DATE: 1956 - 1958
TITLE: SOLVENT CHANGE NOTICES
SUBJECT: HEALTH RECORDS DATE: 1956 - 1958
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN: CP
COMMENT: COMPILATION OF UNANALYSIS CHANGE NOTICES WITH PERSONNEL LISTED BY NAME, BADGE, SHIFT AND BUILDING
- 1-814 AUTHOR: DOW, N. DATE: 1964-10-20
TITLE: HISTORY OF OPERATIONS OF COLEX PROGRESS (ALPHA-4, ALPHA-5 AND COLEX AUXILLARIES)
SUBJECT: TECHNICAL MEMO
REPORT NUM: LXXXV-5358 CLASS: S DRAWER: 10
CUSTODIAN: CP
COMMENT: HISTORICAL TABLES, CHARTS AND NARRATIVES COVERING OPERATION OF COLEX PROCESSES, JANUARY 1955 - MAY 1963
- 1-815 AUTHOR: KITE, H. T. DATE: 1958-05-19
TITLE: A PRELIMINARY STUDY OF THE RECOVERY OF LITHIUM AND MERCURY LOSSES, LETTER FROM H.T. KITE TO N. DOW ET AL
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: DOTY, C. D.
COMMENT: NOTE TO FILE 6/21/83 BY C.D. DOTY RE MERCURY STUDY
- 1-816 AUTHOR: JUNGHANS, P. F. DATE: 1981-06-08
TITLE: A REVIEW OF THE TOXICITY OF METHYLMERCURY COMPOUNDS WITH APPLICATION TO OCCUPATIONAL EXPOSURES ASSOCIATED WITH LABORATORY USE
SUBJECT: OPEN LITERATURE
REPORT NUM: CLASS: U DRAWER: 19
CUSTODIAN: WILCOX, W. J.
COMMENT: ARTICLE TAKEN FROM ENVIRONMENTAL RESEARCH-AN INTERNATIONAL JOURNAL OF ENVIRONMENTAL MEDICINE & ENVIRONMENTAL SCIENCES VOL. 31 NO. 1, JUNE 1983

- 4-817 AUTHOR: CHEM & ENGNG NEWS DATE: 1971-07-05
TITLE: MERCURY: ANATOMY OF A POLLUTION PROBLEM
SUBJECT: OPEN LITERATURE CLASS: U DRAWER: 19
REPORT NUM: REPORTER: CP
CUSTODIAN: COMMENT: DOW CHEMICAL "ZERO-EMISSIONS" PLAN. MINAMATA TRAGEDY.
- 4-817 AUTHOR: EPA DATE: 1971-12-07
TITLE: EPA NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS.
SUBJECT: OPEN LITERATURE CLASS: U DRAWER: 19
REPORT NUM: REPORTER: CP
CUSTODIAN: CASE, J. M.
COMMENT: PROPOSED STANDARDS FOR ASBESTOS, BERYLLIUM, MERCURY. FED. REG., VOL. 36, NO. 234
- 4-817 AUTHOR: CHEMICAL RUBBER CO. DATE: 1972
TITLE: MERCURY IN THE ENVIRONMENT - AN EPIDEMIOLOGICAL AND TOXICOLOGICAL APPRAISAL
SUBJECT: OPEN LITERATURE CLASS: U DRAWER: 19
REPORT NUM: REPORTER: CP
CUSTODIAN: ORNL ENVIRONMENTAL SCI LIB
COMMENT:
- 4-817 AUTHOR: GARRETT, DAVID DATE: 1975-10
TITLE: MATERIALS BALANCE AND TECHNOLOGY ASSESSMENT OF MERCURY AND ITS COMPOUNDS ON NATIONAL AND REGIONAL BASIS
SUBJECT: U REPORTER: CP
REPORT NUM: EPA-560/3-75-007 CLASS: U DRAWER: 19
CUSTODIAN: CP
COMMENT: PREPARED FOR EPA OFFICE OF TOXIC SUBSTANCES
- 4-817 AUTHOR: FORSTNER & WITTMANN DATE: 1979
TITLE: METAL POLLUTION IN THE AQUATIC ENVIRONMENT
SUBJECT: OPEN LITERATURE CLASS: U DRAWER: 19
REPORT NUM: REPORTER: CP
CUSTODIAN: ARENDT
COMMENT: BOOK PUBLISHED BY SPRINGER-VERLAG TELLS OF THE MINAMATA, JAPAN, TRAGIC MERCURY POISONING.
- 4-818 AUTHOR: TYL, E. DATE: 1976-09-30 - 1977-09-30
TITLE: STATUS OF MERCURY INVENTORY
SUBJECT: MERCURY SHIPMENT DATA CLASS: C DRAWER: 7
REPORT NUM: REPORTER: CP
CUSTODIAN: COMMENT: HANDWRITTEN SUMMARY VERIFIED BY TYL

- Y-819 AUTHOR: RICHARDS, E. DATE: 1963-09-26
TITLE: TRIP REPORT - SEPTEMBER 18-19, 1963. LETTER FROM E. RICHARDS (GSA) TO DIRECTOR, INSPECTION DIVISION
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: DOTY
COMMENT: VISUAL INSPECTION SHOWED 25 PERCENT OF Y-12 FLASKS NEEDS TO BE REPLACED DUE TO LEAKAGE
- Y-819 AUTHOR: DUNDON, R. J. DATE: 1974-09-17
TITLE: TRIP REPORT, AUGUST 21-23, 1974. LETTER FROM R. J. DUNDON (GSA INSPECTION DIV.) TO INSPECTION DIV. DIRECTOR
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: DOTY
COMMENT: TRIP TO EVALUATE AEC COMPLAINT ABOUT LEAKING FLASKS
- Y-819 AUTHOR: WARD, JAMES B. DATE: 1974-10-22
TITLE: TRIP REPORT, OCTOBER 1-4, 1974. LETTER FROM JAMES B. WARD (GSA INSPECTION DIV.) TO INSPECTION DIV. DIRECTOR
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: DOTY
COMMENT: INSPECTION OF FLASKS CARBIDE REFUSES TO SHIP BECAUSE OF LEAKAGE CONDITIONS
- Y-819 AUTHOR: GOUGH, LARRY DATE: 1982-02-07
TITLE: DICTATED BY PHONE TO S. B. GOUGH (ORNL) FROM LARRY GOUGH (U.S. GEOLOGICAL SERVICE)
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: AFENDT
COMMENT: ANALYSES OF AQUATIC BRYOPHYTES ALONG BEAR CREEK AND E. FORK POELAR CREEK DEC. 5, 1981
- Y-820 AUTHOR: GRIMES, JAMES G. DATE: 1983-J6-22
TITLE: COMPARISON OF SEDIMENTS, WATERS, AND PLANTS IN THE OAK RIDGE AREA WITH OTHER AREAS OF HIGH MERCURY CONCENTRATIONS
SUBJECT: TECHNICAL REPORTS/MEMOS
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: AFENDT
COMMENT: UCURANIUM RESOURCE EVALUATION PROJECT REPORT
- Y-821 AUTHOR: JOFDAN, R. G. DATE: 1983-05-01
TITLE: ENVIRONMENTAL MONITORING REPORT, U.S. DEPARTMENT OF ENERGY, OAK RIDGE FACILITIES, CY 1982
SUBJECT: TECHNICAL MEMO
REPORT NUM: Y/UB-18 CLASS: U DRAWER: 10
CUSTODIAN: CF
COMMENT:

- Y-822 AUTHOR: DATE: 1973 - 1974
TITLE: CORRESPONDENCE ON THE ZEB BELL MERCURY STUDY
SUBJECT: CORRESPONDENCE, EXTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: WEST, C. H.
COMMENT: Y-12 URINARY MERCURY BIOASSAY DATA FROM ZEB G. BELL, A NIOSH MERCURY CONSULTANT.
- Y-823 AUTHOR: BAUMANN, W. H. DATE: 1953 - 1954
TITLE: SOLVENT URINE PROGRAM - ALLOY DIVISION AND MAINTENANCE PERSONNEL
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: WEST, C. H.
COMMENT: PROCEDURE FOR URINE MONITORING PROGRAM FOR PERSONNEL
- Y-824 AUTHOR: LAFRANCE, L. J. ET AL DATE: 1956
TITLE: SOLVENT ANALYSES FOR PERSONNEL IN BUILDINGS 9201-4 AND 9201-5
SUBJECT: HEALTH RECORDS
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN: WEST, C. H.
COMMENT:
- Y-825 AUTHOR: WEST, C. H. DATE: 1955
TITLE: WATER FLOW FOR EAST FORK POPLAR CREEK
SUBJECT: TECHNICAL MEMO
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: WEST, C. H.
COMMENT: DAILY WATER FLOW IN EAST FORK POPLAR CREEK FOR ONE WEEK PERIODS.
- Y-826 AUTHOR: WEST, C. H. DATE: 1956
TITLE: WATER FLOW IN EAST FORK POPLAR CREEK
SUBJECT: TECHNICAL MEMO
REPORT NUM: CLASS: U DRAWER: 10
CUSTODIAN: WEST, C. H.
COMMENT: DAILY WATER FLOWS DURING A WEEKLY PERIOD
- Y-827 AUTHOR: WEST, C. H. DATE: 1954
TITLE: QUARTERLY HEALTH PHYSICS REPORT FOR BUILDING 9204-4
SUBJECT: HEALTH RECORDS
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN: WEST, C. H.
COMMENT: INCLUDES SOLVENT AIR AND SOLVENT URINE CONCENTRATIONS

Y-829 AUTHOR: DATE: 1958
TITLE: SOLVENT AIR DATA FOR BUILDING 9201-5
SUBJECT: HEALTH RECORDS
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN:
COMMENT:

Y-830 AUTHOR: DATE: 1957
TITLE: SOLVENT AIR DATA FOR BUILDING 9201-5
SUBJECT: HEALTH RECORDS
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN: WEST, C. M.
COMMENT:

Y-831 AUTHOR: DATE: 1957
TITLE: SOLVENT AIR DATA FOR BUILDING 9201-4
SUBJECT: HEALTH RECORDS
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN: WEST, C. M.
COMMENT:

Y-832 AUTHOR: BAUMANN, W. H. DATE: 1953
TITLE: SOLVENT AIR CONCENTRATION IN STACKS
SUBJECT: HEALTH RECORDS
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN: WEST, C. M.
COMMENT:

Y-834 AUTHOR: WEST, C. M. DATE: 1954
TITLE: SOLVENT WEEKLY REPORT FOR BUILDING 9204-4
SUBJECT: HEALTH RECORDS
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN: WEST, C. M.
COMMENT: AIR SAMPLES FROM VARIOUS AREAS OF 9204-4

Y-835 AUTHOR: WEST, C. M. DATE: 1954
TITLE: SOLVENT WEEKLY REPORT FROM BUILDING 9201-2
SUBJECT: HEALTH RECORDS
REPORT NUM: CLASS: U DRAWER: 13
CUSTODIAN: WEST, C. M.
COMMENT: AIR SAMPLES FROM VARIOUS AREAS OF 9201-2

1-836 AUTHOR: McMILLAN, R. G. DATE: 1957-05-07
TITLE: SOLVENT AIR ANALYSES. LETTER FROM R. G. MCMLIAN TO H. C. MOORE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: C DRAWER: 17
CUSTODIAN: WEST, C. M.
COMMENT: REVIEW TO DETERMINE REDUCTION IN RATE OF AIR SAMPLING

1-836 AUTHOR: McMILLAN, R. G. DATE: 1958-04-08
TITLE: SOLVENT AIR ANALYSES. LETTER FROM R. G. MCMLIAN TO J. D. MCLENDON
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: WEST, C. M.
COMMENT: RECOMMENDATION FOR REDUCTION IN FREQUENCY OF AIR MEASUREMENTS

1-836 AUTHOR: WEST, C. M. DATE: 1958-09-04
TITLE: COMPARATIVE STUDY OF AIR SAMPLING INSTRUMENTS. LETTER PRCM C. M. WEST TO J. S. REECE
SUBJECT: CORRESPONDENCE, INTERNAL
REPORT NUM: CLASS: U DRAWER: 17
CUSTODIAN: WEST, C. M.
COMMENT: STUDIES TO MONITOR SOLVENT CONCENTRATIONS IN THE AIR AT THE SLUDGE BURNER IN BLDG. 81-10

1-837 AUTHOR: DATE: 1955-12-12
TITLE: SOURCE SAMPLES IN 9201-5
SUBJECT: HEALTH RECORDS CLASS: U DRAWER: 13
REPORT NUM: CUSTODIAN: WEST, C. M.
COMMENT:

1-838 AUTHOR: DATE: 1955
TITLE: VENTILATION IN ALPHA-5
SUBJECT: HEALTH RECORDS CLASS: U DRAWER: 13
REPORT NUM: CUSTODIAN: WEST, C. M.
COMMENT: INCLUDES ALPHA-5 VENTILATION DRAWINGS

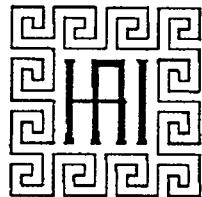
1-839 AUTHOR: SANDERS, H. DATE: 1956
TITLE: EXHAUST STUDY - ALPHA 5
SUBJECT: HEALTH RECORDS CLASS: U DRAWER: 13
REPORT NUM: CUSTODIAN: WEST, C. M.
COMMENT: VENTILATION DRAWING; LISTING OF EFFLUENT MERCURY CONCENTRATION BY LOCATION AND EQUIPMENT DESIGNATION

Y-12 MERCURY TASK FORCE FILES:
A GUIDE TO RECORD SERIES OF THE DEPARTMENT OF ENERGY
AND ITS CONTRACTORS

DRAFT

*appears to be identical to
Feb 17, 1995 version*

October 12, 1994



History Associates Incorporated
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Prepared for the U.S. Department of Energy
Office of Epidemiology and Health Surveillance
under Contract No. DE-AC01-93EH89246

DRAFT BASED ON RESEARCH COMPLETED JUNE 1994

Snow

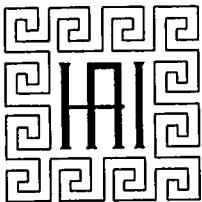
F Y E

Tom

Reed
10-25

(This just in)





HISTORY ASSOCIATES INCORPORATED

5 CHOKES CHERRY ROAD, SUITE 280
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March 8, 1995

Mr. U.Y. Moon
Shonka Research Associates, Inc
On-Site Coordinator-Task 5
Oak Ridge Health Studies
132 Mitchell Road
Oak Ridge, Tennessee 37830

Dear Mr. Moon:

As part of its contract with the U.S. Department of Energy's (DOE) Office of Epidemiology and Health Surveillance (EH-42) to identify, inventory, and describe record series within the Energy complex that pertain to epidemiologic and health-related studies, HAI has prepared Guides to records pertaining to RaLa, iodine-131, and cesium-137 information at the Oak Ridge National Laboratory and the Oak Ridge Operations Office; records pertaining to cesium at the K-25 Plant; and the Y-12 Mercury Task Force Files. I have discussed your request for the electronic version of these guides with Barbara Brooks, of EH-42, and she has authorized HAI to furnish them to you on the enclosed diskette, in Wordperfect 5.1 under the following conditions. The electronic version of each guide is for your personal research only, and under no conditions are the contents of any guide to be altered or changed in any way. Although you may print portions of the guides for your personal use, you may not print entire guides and distribute them to any person or organization.

Thank you very much for your cooperation and if you have questions concerning these conditions and the use of the guides, please call me at 301-670-0076.

Sincerely,

Nancy M. Merz, CA, CRM
Vice President for Archives
and Records Management

Enclosure

List of Reports (HAI)

Need to Review

- 1949-1953 ✓ Health Physics(Hygiene) Progress Reports (request ~~III~~ pages)
1954-63 ✗ Radiation Safety Reports = Boxes!
1953-82 ✗ Technical Memoranda
" ✗ Technical Reports

Chk. Uselessness

- ~~1955-59~~ Alloy Div. Weekly Progress - acid works
~~1955-61~~ " Monthly Progress - acid works
1955-63 → 1-12 Prodtn/Ops Records - 24, ~~25~~ only

Accountability Records (6)

\rightarrow ~~graph~~

line 2)

Rads (D)

~~Hg memo's~~

Have Looked At - ~~Useful~~ Useful (why!)

- 1959-75 ()
1955-58 (1955) X Technical Div. Monthly - " " Quarterly → EFPC Monthly Avgs. (request water graphs)
1952-81 (1952-55) 2. 4-12 Plant Quarterly " " Quarterly Avgs. ✓ chk. 1956-65 for accd.
3. Hg Solvent Fin Sampling Records - may be in boxes / checked-out Li
4. Poplar Creek H₂O Analysis - " " " "

~~note Hg
for extracting~~

~~Radiation Safety Reports, 1954-1963~~

These are Air Data Boxes!
per printout
q.yrs.

Location: 1. Active:
2. Inactive: Y-12 Records Center, 9711-5 Room 106

Access Restrictions: Unclassified

Volume: 22 File Folders;
0.92 linear feet

Accession or Other ID Number: M258-260,
M265-266, M269-272, M275-276, M278-279,
M281-285, M482, M487-488

Condition: Good

255-285
missing?

(21)

Container Numbers: Drawers 5, 10

these are H₂O Sampling data

Medium: Paper

Scanning Suitability: Suitable

Y/HG-196
for 1958

Duplication: May be part of
the unclassified collection, see
statement on page 12
13

Arrangement: Numerical by file code

Originating Office: Radiation Safety Department

Finding Aids: Y-12 Mercury Task Force Database Printout; *Mercury at Y-12* (Y/EX-24)
Bibliography

Disposition Authority: Permanent Collection

Series Description: This record series contains documents produced by the Y-12 Radiation Safety Department. The majority of these records consist of daily solvent air sampling results from October 1955 to August 1963. Mercury measurements are reported in milligrams/cubic meter (mg/m³) for buildings 9201-4, 9201-5, and 9201-2. Other records pertain to the exposure of personnel to mercury in buildings 9201-4 and 9201-5, and urinalysis reports for the period from 1954 to 1960. Documents describing the use of respirators to safeguard workers against mercury vapor and the decontamination of mercury work areas during 1956 are included.

Solvent Hazards Committee, 1955-1956: This is a subseries which evaluated air contamination data for building 9201-5 to determine if the existing ventilation system could be improved to supply greater air circulation and reduce concentration of mercury vapor. These records consist mainly of memoranda, correspondence, minutes, and copies of procedures developed by the Solvent Hazards Committee for safeguarding the workplace and workforce against mercury exposure, including statements on the use of respirators and protective clothing. Air sampling data milligrams/cubic meter (mg/m³) of mercury and urinalysis data milligrams/liter (mg/l) of mercury are included.

Data Elements: 62, 68, 75, 81, 107

1956 only

Mercury Solvent Air Sampling Records, 1954-1959

X ✓

Location: 1. Active:
2. Inactive: Y-12 Records Center, Building 9711-5 Room 106

Access Restrictions: Classified, Secret/RD

Volume: 3 File Folders;
0.125 linear feet

Accession or Other ID Number: 14-12-12,

20-9-17 (2 files with same number)
per my box list
slb A-2 and 9204-2; 1955 dates
in

Solvent
united
not on my
box list

Condition: Fair

Container Numbers: Drawer 9

Medium: Paper

Scanning Suitability: Letters are suitable,
charts and blueprints are unsuitable

Duplication: May be part of
the unclassified collection, see
statement on page 12
13

dates?
L-4 + L-5
1956
monthly %>.1
summaries

Arrangement: Numerical by file code

Originating Office: Division unknown

Finding Aids: Y-12 Mercury Task Force Database Printout; *Mercury at Y-12* (Y/EX-24)
Bibliography

Disposition Authority: Permanent Collection

? **Series Description:** This record series contains results of air samples analyses from buildings 9201-4 and 9201-5. The information includes the number of samples taken each month, in units of concentration in milligrams/cubic meter (mg/m^3) of mercury in air. The results are reported by giving the percentage of samples falling into concentration ranges (with intervals of $0.1 \text{ mg}/\text{m}^3$) between <0.1 and $>1.0 \text{ mg}/\text{m}^3$. Computer printouts and charts of readings of monitors placed in the ventilation system of buildings 9201-4 and 9201-5 are included along with blueprints of the monitoring system. The health physics and Y-12 engineering divisions performed the air sampling and analyses that include fan number, date of sample, location, and concentrations.

Data Elements: 117, 124

Y-12 Production/Operation Records, 1955-1963

Location: 1. Active:
2. Inactive: Y-12 Records Center, Building 9711-5, Room 106

Access Restrictions: Secret/RD

Volume: 19 file folders;
0.792 linear feet

Accession or Other ID Number: M77, M246,
M247, M248, M249, M250, M251, M252, M253,
M254, M256, M269, M585, M587, M588,
M589, M591, M592, M751

M722?

Condition: Good

Container Numbers: Drawers 5 and 11

Medium: Paper

Scanning Suitability: Text is suitable for
scanning; graphs, tables, charts, and
photographs may not be suitable.

Duplication: May be part of
the unclassified collection, see
statement on page 12
13

Arrangement: Numerical by file code

Originating Office: Production Division

Finding Aids: Y-12 Mercury Task Force Database Printout; *Mercury at Y-12* (Y/EX-24)
Bibliography

Disposition Authority: Permanent Collection

Series Description: This record series provides both quantitative and qualitative information on the operation of the lithium separation and enrichment processes in Building 9201-4 (Alpha 4) and Building 9201-5 (Alpha 5) between 1955 and 1966. The series consists of two subseries: 1) Shift Foreman's Logbooks, Alpha 4 and Alpha 5, 1955-1963 and 2) Operations Foreman's Logbooks, Alpha 4 and Alpha 5, 1955-1966.

Y-12 Production/Operation Records, 1955-1963 (continued)

***Series Description* (continued)**

- 1) **Shift Foreman's Logbooks, Alpha 4 and Alpha 5, 1955-1963:** This subseries provides information on the following aspects of Alpha 4 and Alpha 5 operations: daily feed pump and extract (1961); Alpha 4 decomposition (1956); instructions for Alpha 4 cascade procedures (6/1955-3/1957; 3/1957-12/1958; 12/1958-12/1962); instruction for power use in Alpha 5 cascade (12/1962-6/1963); instruction for Alpha 4 and Alpha 5 auxiliary operations (12/1957-8/1958); Alpha 4 mercury and alloy losses (5/1958-3/1961); and Alpha 4 and Alpha 5 salt and mercury sump losses (4/1961-11/1961; 1/1962-5/1963).
- 2) **Operation Foreman's Logbooks, Alpha 4 and Alpha 5, 1955-1966:** This subseries provides information on the following aspects of Alpha 4 and Alpha 5 operations: daily feed pump and extract (1958; 1960); Alpha raw data Colex reports (1956, 1957, 1959); Y-12 feed salt status (1955); standard operating procedures for Colex (1954); and daily production records of Alpha 4 and Alpha 5 cascades (1955-1966).

Data Elements: 8, 88, 115, 119, 120, 124

Inventory
Mercury Accounting and Budget Records, 1949-1978

Location: 1. Active:
2. Inactive: Y-12 Records Center, Building 9711-5, Room 106

Access Restrictions: Unclassified, Confidential/RD,
Secret/RD

Volume: 60 File Folders;
2.5 linear feet

Accession or Other ID Number: M41, M46,
M50, M60, M67, M71-72, M83, M208-211,
M213-216, M222-224, M325, M425, M468-476,
M500-504, M506-507, M602

Condition: Good

Container Numbers: Drawers 1-2, 4, 6, 8, 10-12

Medium: Paper

Scanning Suitability: Suitable

Duplication: May be part of
the unclassified collection, see
statement on page 12
13

Arrangement: Numerical by file code

Originating Office: Production Division

Finding Aids: Y-12 Database Printout; *Mercury at Y-12* (Y/EX-24) Bibliography

Disposition Authority: Permanent Collection

Series Description: This record series consists of accounting and budget records concerning shipment, receiving, flasking and storage, inventory, loss, and recovery of mercury at Y-12 from 1949 to 1978. Records include procedures and audits for accountability and flassing of mercury and solvents, budget estimates, mercury storage and shipment receipts, amounts of mercury lost and associated costs, procurement data, inventory lists, accountability of mercury excess and loss, correspondence relating to accounting and budget, and reports of the investigating committee that compiled the first inventory of Y-12 mercury use in 1977. Some documents pertain to the reclassification and security operations of Alpha 4 and 5 (Buildings 9201-4 and 9201-5). A floor plan for building 9201-5 is included.

Data Elements: 89, 115, 117

M-477

Mercury Flasking and Storage, 1970-1975 ✓ just include in Hg Flask Data "series"

Location: 1. Active:
2. Inactive: Y-12 Records Center, Building 9711-5, Room 106

Access Restrictions: Unclassified, Confidential/RD,
Secret/RD

Volume: 1 File Folder;
0.04 linear feet

Accession or Other ID Number: M42

bottling of Hg
1972-1975

Condition: Good

Container Numbers: Drawer 1

Medium: Paper

Scanning Suitability: Suitable

Duplication: May be part of
the unclassified collection, see
statement on page 12
13

Arrangement: Numerical by file code

Originating Office: Processing Department and Manufacturing Division

Finding Aids: Y-12 Mercury Task Force Database Printout; *Mercury at Y-12* (Y/EX-24)
Bibliography

Disposition Authority: Permanent Collection

Series Description: This record series contains documents concerning the flassing and storage
of mercury at Y-12 from 1970-1975. The records include correspondence and inventories
documenting the amounts of mercury in pounds and gallons, the costs of both flassing and
storage, and the original source of the mercury, most of which came from the General Services
Administration (GSA) stock pile.

Data Elements: 88, 89, 115, 117

wing + Storage

Mercury Flask Data, 1962-1979

Location: 1. Active:
2. Inactive: Y-12 Records Center, Building 9711-5, Room 106

Access Restrictions: Unclassified, Confidential/RD,
Secret/RD

Volume: 17 File Folders;
0.7 linear feet

M42
Accession or Other ID Number: M41, M56,
M75, M81, M306, M321, M323, M348, M350,
M356, M363, M367, M405, M409-410, M416

Condition: Fair

Container Numbers: Drawers 1, 2, 6, 7, 8

Medium: Paper

Scanning Suitability: Unsuitable

Duplication: May be part of
the unclassified collection, see
statement on page 12
13

Arrangement: Numerical by file code

Originating Office: Various divisions, including Metal Preparation Division, Production Division, and Supply Operations Branch

Finding Aids: Y-12 Mercury Task Force Database Printout; *Mercury at Y-12* (Y/EX-24) Bibliography

Disposition Authority: Permanent Collection

Series Description: This record series consists of data on mercury flasking, storage, and inventory of mercury. Correspondence discussing procedures for quality control of mercury flanking is interspersed throughout the files. The series also contains logbooks for flanking mercury and inventory lists of mercury. Topics represented in the records include handling costs for flanking, storing, and shipping mercury; certification of compliance on mercury storage flasks; laboratory analysis data; and safety analysis of flanking operations and mercury recovery data.

Data Elements: 88, 115, 117, 120, 123

Mercury Inventory and Flasking Reading File, 1962-1968 ✓ incl. with flasking series

Location: 1. Active:
2. Inactive: Y-12 Records Center, Building 9711-5, Room 106

Access Restrictions: Confidential/RD, Secret/RD

Volume: 2 File Folders;
0.08 linear feet

Accession or Other ID Number: M40-M41
1960-69 correspondence mostly about flasking,

Condition: Good

Container Numbers: Drawer 1

*2 procedures 1965 (handling Hg)
1961-64*

Medium: Paper

Scanning Suitability: Suitable

*inventories 1-4 & 5
1913 - spec. for new Hg flasks*

Duplication: May be part of the unclassified collection, see statement on page 12
13

Arrangement: Numerical by file code

Originating Office: Plant Superintendent and Production Division

Finding Aids: Y-12 Mercury Task Force Database Printout; *Mercury at Y-12* (Y/EX-24) Bibliography

Disposition Authority: Permanent Collection

Series Description: This record series consists of correspondence, inventory lists, procedural statements, and reports on quantities of mercury handled at Y-12 from 1962-1968. Included in the series is the total cost and quantity (pounds) of mercury on site. The documents indicate the amounts of mercury lost at Y-12 and the quantity not recovered.

Data Elements: 88, 89, 115, 120

and Transfer

Mercury Shipment Data, 1955-1982

Location: 1. Active:
2. Inactive: Y-12 Records Center, Building 9711-5, Room 106

Access Restrictions: Unclassified, Confidential/RD,
Secret/RD

Volume: 66 File Folders;
2.75 linear feet

Accession or Other ID Number: M40-49, M51-55,
M64-68, M74, M76, M78-79, M81, M212,
M326-328, M331-333, M335, M351, M354-355,
M368, M374-381, M385-388, M394-396, M398-401,
M403, M405-407, M415, M423-424, M426-430,
M513, M818

Condition: Good

Container Numbers: Drawers 1-4, 6-8, 10, 13

Medium: Paper

Scanning Suitability: Suitable

Duplication: May be part of
the unclassified collection, see
statement on page 12
13

Arrangement: Numerical by file code

Originating Office: Process Analysis, Production Division, and Plant Supervisor

Finding Aids: Y-12 Mercury Task Force Database Printout; *Mercury at Y-12* (Y/EX-24)
Bibliography

Disposition Authority: Permanent Collection

Series Description: This record series contains mercury shipment data documenting the incoming and outgoing amounts of mercury used in the production of lithium deuteride at Y-12. The majority of the documents are inventory lists and logbooks of mercury and solvents = Hg from the Alpha and Beta processing facilities. Records include shipping and receiving receipts for mercury between Y-12 and the General Services Administration (GSA) stockpile and other organizations. Interspersed throughout the files is correspondence and internal memoranda regarding the mercury shipments and procedural statements from Atomic Energy Commission (AEC), Energy Research and Development Administration (ERDA), Department of Energy (DOE), GSA, and Y-12.

Data Elements: 15, 88, 114, 120

**Y-12 MERCURY TASK FORCE FILES:
A GUIDE TO RECORD SERIES OF THE DEPARTMENT OF ENERGY
AND ITS CONTRACTORS**

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Y-12 MERCURY TASK FORCE FILES: A GUIDE TO RECORD SERIES OF THE DEPARTMENT OF ENERGY AND ITS CONTRACTORS

INTRODUCTION

Overview

The purpose of this guide is to describe each of the series of records identified in the documents of the Y-12 Mercury Task Force Files that pertain to the use of mercury in the separation and enrichment of lithium isotopes at the Department of Energy's (DOE) Y-12 Plant in Oak Ridge, Tennessee. History Associates Incorporated (HAI) prepared this guide as part of DOE's Epidemiologic Records Inventory Project, which seeks to verify and conduct inventories of epidemiologic and health-related records at various DOE and DOE contractor sites.

This introduction briefly describes the Epidemiologic Records Inventory Project and HAI's role in the project. Specific attention will be given to the history of the DOE-Oak Ridge Reservation, the development of the Y-12 Plant, and the use of mercury in the production of nuclear weapons during the 1950s and early 1960s. This introduction provides background information on the Y-12 Mercury Task Force Files, an assembly of documents resulting from the 1983 investigation of the Mercury Task Force into the effects of mercury toxicity upon workplace hygiene and worker health, the unaccountable loss of mercury, and the impact of those losses upon the environment. This introduction also explains the methodology used in the selection and inventory of these record series. Other topics include the methodology used to produce this guide, the arrangement of the detailed record series descriptions, and information concerning access to the collection.

The Epidemiologic Records Inventory Project

The Epidemiologic Records Inventory Project reflects DOE Secretary Hazel R. O'Leary's efforts to support openness initiatives in the areas of environment, safety, and health. In view of the importance of various administrative, organizational, and operational records to epidemiologic and health-related studies, a moratorium on the destruction of such records has been in effect since 1989.

In May 1992, the DOE Office of Epidemiology and Health Surveillance (EH-42), responsible for coordinating all epidemiologic activities throughout the Energy complex, directed each DOE site and DOE contractor to prepare an inventory of all records pertinent to worker or community health-related studies. EH-42 prepared and furnished each site with guidelines that defined epidemiologic records, provided instruction for describing record series, outlined the site's role in inventorying epidemiologic records, and discussed the relationship of the epidemiologic inventory to DOE's comprehensive records inventory. These inventories should be completed in 1995.

In August 1993, DOE selected History Associates as its support services contractor for the Epidemiologic Records Inventory Project. HAI, a professional records management,

archives, and historical research services firm incorporated in 1981, has provided records management, historical research, and technical support for a number of DOE projects. HAI's role in this project includes verifying the accuracy, comprehensiveness, and quality of existing inventories, providing guidance to site records management teams, and, in some cases, conducting additional inventories.

As part of its task to verify and conduct inventories of epidemiologic and health related records at DOE and DOE contractor sites, HAI conducted a pilot study at the DOE-Oak Ridge Reservation. The primary purpose of this pilot project was to assist DOE in responding to the information needs identified in a March 1994 meeting with DOE, the Tennessee Department of Health (TDH), and other stakeholders. These groups expressed interest in the records relating to radioactive lanthanum (RaLa), iodine-131 and iodine-133, cesium-137, and the classified mercury collection. HAI began this task by inventorying and describing the record series contained in the collection of classified documents related to operations using large quantities of mercury. HAI is currently identifying and inventorying records relating to RaLa, iodine, and cesium, as well as resolving protocol and access issues. Although the identification and inventory of record series relating to other topics are still in progress, this process when completed, will allow DOE to provide the best possible assistance to health researchers interested in using the records relating to these hazardous substances.

HISTORY OF OAK RIDGE

The Oak Ridge Reservation

Oak Ridge, Tennessee, was one of three sites established by the Manhattan Project during World War II for the development of the first atomic bombs. Selected on September 19, 1942, the Clinton Engineering Works (CEW), later named Oak Ridge Reservation (ORR), supported three major production centers. The X-10 site, which later expanded to become the Oak Ridge National Laboratory (ORNL), housed the first large-scale graphite reactor. Known then as the Clinton Pile, the graphite reactor provided irradiated uranium slugs from which plutonium could be separated at the Oak Ridge pilot plant. The Y-12 facility produced enriched uranium-235 by electromagnetic separation; and the last production plant, K-25, produced enriched uranium-235 by the gaseous diffusion method.

The Oak Ridge plants produced significant amounts of hazardous waste by-products, and the Environmental Protection Agency (EPA) included Oak Ridge on its National Priorities List of Superfund hazardous waste sites in November 1989. In 1991 DOE signed the Oak Ridge Health Agreement that provides funds to the state of Tennessee for independent health assessment studies of the Oak Ridge operations and the surrounding population.

The Y-12 Plant

Since its inception in 1943, the official mission of Y-12 has changed over the decades. Originally, Y-12 separated the fissionable uranium isotope, uranium-235, from the more plentiful, but stable uranium-238 isotope, using the electromagnetic process. After the war, when this process was discontinued, Y-12's mission changed to manufacturing and developmental engineering. The plant produced nuclear weapon components, developed and fabricated test hardware for weapons, processed source and special nuclear materials, provided fabrication support for other Oak Ridge Reservation Plants, and supported other federal agencies. Y-12 recovered enriched uranium from obsolete weapons and scrap materials, processed enriched uranium from other DOE sites, and produced lithium compounds. Currently, the plant's mission is to serve as a key technology center for the development and demonstration of unique materials, components, and services of importance to DOE and the nation. Y-12 accomplishes its mission through the manufacture, reclamation, and storage of nuclear materials, construction of components for the nation's defense capabilities, and support of national security programs.

Since 1943, three contractors have operated the Y-12 Plant for the Manhattan Engineer District (MED) and its successor agencies. Tennessee Eastman, a subsidiary of Eastman Kodak Company, was the original contractor with the US Army Corps of Engineers. The Atomic Energy Act of 1946 assigned all atomic energy activities to the US Atomic Energy Commission (USAEC), effective January 1, 1947, and, later that year, the MED disbanded. In 1947, the Carbide and Carbon Chemical Corporation (CCCC), which later became known as Union Carbide Corporation (UCC)-Nuclear Division, replaced Tennessee Eastman and remained the Y-12 site contractor until 1984. In that year, Martin Marietta Energy Systems (MMES) assumed the Y-12 contract.

Lithium Isotope Separation and Enrichment at Y-12

In the early 1950s, the United States started to develop thermonuclear weapons. Unlike previous nuclear weapons, which derived their explosive force from the fission of uranium atoms, these new weapons obtained their energy from the fusion, or combination, of heavy hydrogen atoms. For this reason, these weapons became known as hydrogen bombs.

The primary material used in thermonuclear weapons was a form of hydrogen fuel known as lithium deuteride, produced from the lithium-6 isotope. Naturally occurring lithium contains about 7 percent of the lithium-6 isotope, while the rest of it is the lithium-7 isotope. In the 1950s, the Y-12 Plant developed, designed, constructed, and operated an industrial scale production process to separate and enrich the lithium-6 isotopes from lithium-7 isotopes for the production of lithium deuteride.

The separation process that produced most of the lithium deuteride was called Colex, a column-exchange process, in which the lithium isotopes were separated as the lithium was transferred between two chemical phases. One of the phases was an aqueous solution of lithium hydroxide and the other a lithium amalgam, a solution of lithium in mercury. The

lithium-6 isotope dissolved more thoroughly in mercury than lithium-7. Lithium amalgam remained in a stable state while in contact with an aqueous solution. In other words, the lithium-6 atoms migrated to the amalgam and the lithium-7 atoms adhered to the lithium hydroxide in the aqueous fluid. Cold War production schedules of lithium deuteride required millions of pounds of mercury, and President Eisenhower authorized Y-12 to use a significant portion of the mercury from the National Stockpile for the Colex process from 1955 to 1963.

Colex operations were located in Buildings 9201-4 (Alpha 4) and 9201-5 (Alpha 5), and these became the mainstay of Y-12's lithium separation and enrichment process. Active from 1955 to 1963, Colex operations produced enough enriched lithium to fulfill anticipated future needs in the weapons program. In 1963, the Y-12 lithium separation and enrichment program was shut down, and over the next several years, the plant was engaged in dismantling production equipment and recovering mercury from the production facilities and equipment. Most of the equipment still remains in Building 9201-4.

Oak Ridge developed and used other methods to separate lithium isotopes. In the early 1950s, ORNL experimented with substituting water with an organic solvent. This process, known as Orex, an organic exchange process, was not pursued beyond the pilot stage because of technical difficulties. Buildings 9733-1 and 9202 housed the Orex pilot plants from 1951 to 1953. Another method used in the separation of lithium isotopes was Elex, an electro-chemical separation process. Elex was conducted in Buildings 9733-2 and 9201-2 between 1950 and 1951. A production scale Elex process was started up in Building 9204-4 (Beta 4) and operated from 1953 to 1956. By 1956, Y-12 found Elex to be an inefficient process, abandoned it entirely, and operated the Colex process only.

THE ESTABLISHMENT OF THE Y-12 MERCURY TASK FORCE FILES

The 1983 Mercury Task Force

The Y-12 Mercury Task Force Files represent the result of a 1983 investigation into the use of mercury at Y-12 during the 1950s and early 1960s. This investigation, by a group of Y-12 employees unassociated with the lithium separation and enrichment processes, followed the May 17, 1983, publication of a declassified version of *Mercury Inventory at Y-12 Plant, 1950 Through 1977* (Y/AD-428). The publication of this report generated much media and public interest in the use of mercury at Y-12, especially in the effects of mercury toxicity on worker health, the unaccountable loss of mercury, and the impact of those mercury losses on the environment.

On May 20, 1983, Y-12 managers selected a Task Force to investigate the apparent mercury problem at Y-12. The Task Force's investigation took eight weeks, during which time the group collected pertinent documents concerning the lithium separation and enrichment processes, mercury material accountability, monitoring of the workplace for

mercury contamination, worker exposure, and environmental releases. Following the investigation, the Mercury Task Force summarized its findings in a classified report entitled *Mercury at Y-12: A Study of Mercury Use at the Y-12 Plant, Accountability, and Impacts on Y-12 Workers and the Environment-1950 to 1983* (Y/EX-21). A declassified version (Y/EX-24) is available, as is *Mercury at the Y-12 Plant: A Summary of the 1983 UCC-ND Task Force Study* (Y/EX-23).

Workplace Hygiene and Worker Health

An area of interest of the Mercury Task Force was the impact of mercury toxicity on workplace hygiene and worker health. From the beginning of the lithium isotope separation and enrichment process at Oak Ridge, AEC officials and Y-12 Plant managers and industrial hygienists recognized the need to safeguard and monitor the health of the workforce. From 1950 to 1954, industrial hygiene programs were instituted in the Orex, Elex, and Colex pilot plants. With the industrial scale use of mercury in the Colex operations after 1954, these officials became especially concerned about the medically recognized hazards of inhaling toxic mercury vapor. Since greater quantities of mercury would be used in full-scale Colex operations than previously, the plant expanded existing industrial hygiene programs and implemented new ones to protect worker health.

The Colex process was a pioneering technology that required specialized pumps, valves, and other equipment not used previously for such applications. Plant engineers anticipated frequent maintenance and operational problems during the initial months of operation. In 1955, the first full-scale year of the Colex process, the pumps and valves required much service and repair. Often the processing system was full of mercury and large quantities of it leaked and spilled on the floor. Drainage systems were modified so that the floor drains would direct the mercury into special tanks that separated the mercury from wastewater, mainly mopwater, collected in sumps that emptied into the creek.

From the outset of the Colex operations in 1953, Y-12 conducted both routine air sampling to monitor the mercury concentrations within the workplace and a urinalysis program to monitor individual worker exposure. During the start-up of Colex operations in 1955, air sampling indicated that mercury concentrations in Buildings 9201-4 and 9201-5 were higher than the then recommended standard of 0.1 milligram/cubic meter (now 0.5 mg/m³). Urinalysis also indicated that workers had been exposed to higher concentrations of mercury than normal in 1955. In general, the risk of mercury exposure was greatest in 1955 and 1956, the ramp-up years of Colex operations. After 1956, the risk declined as air sampling data indicated mercury concentrations below the threshold limit value of 0.1 mg/m³.

In addition to the air sampling and urinalysis programs, Y-12 conducted a special medical surveillance program of the Colex workforce. Workers were medically examined every six months and workers with a history of albuminuria, kidney problems, or hypertension were screened out and not assigned to work in mercury exposed areas.

In late 1955, AEC and Y-12 managers instituted various mechanisms to reduce mercury concentrations in the workplace and safeguard worker health. The plant studied paints and other substances that could reduce vapor pressure and dissolve mercury droplets. Large fans were installed at the ends of the process buildings to remove contaminated air and circulate fresh air throughout the production areas. A special vacuum system was installed for mercury removal. In early 1956, the plant emphasized the use of respirators and, after a close examination of the commercially available respirator filter cartridges, selected the Mersorb cartridge for use by Colex workers. The effectiveness of these and other measures is documented in the historical record of air concentrations, which shows significant reduction of mercury concentrations in the air by March 1956 and successful control of mercury release during the subsequent operating years.

Worker Medical and Mortality Studies, 1974-1983

The Mercury Task Force reviewed existing medical and mortality studies of mercury workers and suggested an additional one. In 1974, the National Institute for Occupational Safety and Health (NIOSH), under the direction of Dr. Z. Bell, conducted a medical check-up of 23 former Colex workers still employed at Y-12. Bell's examination revealed no cases of mercury poisoning and only one case of mercurialensis, a harmless discoloration of the eye, in a worker for whom there was no record of exposure.

In 1983, Oak Ridge Associated Universities conducted a preliminary mortality study of the Y-12 mercury workforce (1,477) and other Y-12 workers (4,920), comparing these groups to the U.S. population as a whole, to see if the death rates were higher for workers exposed to mercury than those not exposed to mercury. No differences were found between either cohort of Y-12 workers and the U.S. population, and no difference was found between Y-12 mercury workers and other Y-12 workers in death rates due to cancer, neurological disease, respiratory disease, and kidney failure.

As a result of the investigation by the Mercury Task Force, Y-12 initiated a special medical examination of the Y-12 mercury workforce, a study that offered the opportunity to evaluate a large group of people (2,450) 20 years after well documented exposure to mercury (27,000 urinalyses). Whereas studies conducted elsewhere of human populations with similar degrees of mercury exposure indicated no organic effects, this one could offer different results since the Y-12 population was larger and had a longer term after exposure. The investigators were looking for the most common symptoms of chronic metallic mercury poisoning--tremors, memory loss, and gingivitis. These symptoms are also signs of the natural aging process, another characteristic of the extant Y-12 mercury workforce. In August 1983, Y-12 selected eight experts in mercury toxicity and chronic mercurialism diagnosis and requested their recommendations on what tests and procedures should be used in this examination.

Mercury Material Balance

According to the 1977 Mercury Inventory Report, 2.4 million pounds of mercury were "lost" or "spilled" during the lithium separation process. Although the report correctly referred to this figure as the amount "lost" or "spilled" plus an "unaccounted for" amount, the subsequent public debate over the Y-12 mercury problem obscured the distinctions between those terms. The Task Force attempted to clear up the confusion over the amount of mercury "lost" and the amount "unaccounted for" by reviewing the extant records dealing with shipping, receiving, flasking, storage, accounting, and budget.

After reviewing the records, the Mercury Task Force determined that 2.0 million pounds of mercury were "lost" or "unaccounted for." The Task Force reported a lower figure than the 1977 Inventory Report because it found increases in several areas in which mercury was unaccounted for originally. The Task Force arrived at a lower amount of losses because in its in-depth review of the records, it was able to account for mercury previously believed to be lost. Of the 2.0 million pounds of "lost" mercury, the Task Force determined that 0.7 million pounds could be traced to losses to the environment.

The Task Force concluded that 1.3 million pounds of mercury still remained "unaccounted for," estimating that 60,000 pounds might be located within the structure of the buildings--inside the walls, ceilings, floors, and insulation. These are areas where the mercury would have been hardest to recover, as vapors and droplets were absorbed into these fixtures throughout the period of greatest mercury use. The Task Force based this estimate on an EPA study of the chlor-alkali industry, which showed substantial losses of mercury each year by absorption into building structure.

After its investigation, the Task Force remained uncertain about how much mercury was actually received at Y-12 during the 1950s and early 1960s. Rust Engineering conducted the mercury receiving operation for the AEC at Y-12. All records concerning such receipt had been transferred to the Federal Records Center in East Point, Georgia, and subsequently destroyed. The Task Force failed to uncover any data concerning the amount of mercury received at Y-12, but, based on interviews with former AEC officials, speculated that the facility had received somewhere between 500,000 and 900,000 pounds. From interviews, the Task Force also learned that much of the mercury was never weighed by the GSA, the AEC, Y-12, or Rust Engineering. These interviews revealed that the mercury flasks, which held up to 76 pounds of the substance, often leaked and many were not full when emptied into the Colex cascade.

METHODOLOGY

In a March 1994 meeting with DOE, the Tennessee Department of Health and other stakeholders, HAI agreed to identify, inventory, and describe the record series which comprise the Y-12 Mercury Task Force Files. Since the records were already gathered as

part of the investigation of the 1983 Mercury Task Force, there was no need for HAI to formulate criteria for the identification and selection of these records. Instead the HAI team familiarized themselves with the history of Oak Ridge, the Y-12 Plant, the use of mercury there, and the lithium isotope separation and enrichment processes. HAI accomplished background research through a thorough review of *Mercury at the Y-12 Plant: A Summary of the 1983 UCC-ND Task Force Study* (Y/EX-23) and *Mercury at Y-12* (Y/EX-24) reports and the *Oak Ridge Health Studies: Phase 1 Report*, produced by ChemRisk in September 1993. HAI also conducted a preliminary examination of the Y-12 Mercury Task Force Files in March 1994.

In June 1994, HAI identified, inventoried, and described the record series of the Y-12 Mercury Task Force Files. Because of the sensitivity of this collection (a majority of the documents are classified as being Confidential, or Secret Restricted Data for national security reasons) classification officers at Y-12 reviewed HAI's completed inventory forms. For quality control, a member of HAI senior management reviewed the inventory that was completed by a different HAI employee against the actual records.

Data Elements

In accordance with the guidelines in *Information Required by the Department of Energy for Epidemiologic and Health Studies*, DOE developed a list of 123 (later revised to 85) data elements to assign to record series descriptions. In general, the data elements consist of terms pertaining to contractor organizations, individual employees, industrial hygiene activities, and facilities characteristics that help categorize and describe the major information contained in each of the record series. The data elements assigned to each record series are listed as numbers that correspond to the data elements found in Appendix A.

PRODUCTION AND USE OF THE GUIDE

After completing the inventory at the Y-12 Record Center, HAI researchers analyzed their inventory forms and described their contents. Information on each record series found in this guide includes the title of the series, their inclusive dates, location, active or inactive status, access restrictions, accession or other identification number, total volume, and the numbers of the record containers. Descriptions of the record series also provide information on the medium in which the record exists, their suitability for electronic scanning, their physical condition, the availability of finding aids, the arrangement of the records, the originating office, any known duplication, and the disposition authority.

LIMITATIONS OF THE GUIDE

This guide reflects HAI's June 1994 inventory and description of the record series of the Y-12 Mercury Task Force Files. HAI inventoried the collection at a record series level and, therefore, the information provided represents a broad description of the documents rather than a description of each individual document. Researchers who want to see a brief description of most of the documents in the Y-12 Mercury Task Force Files should consult the unclassified version of a report, *Mercury at Y-12: A Study of Mercury Use at the Y-12 Plant, Accountability, and Impacts on Y-12 Workers and the Environment-1950-1983* (Y/EX-24). Titles of documents that are classified have been removed from this report.

ARRANGEMENT OF THE GUIDE

History Associates grouped the record series descriptions into four categories in order to facilitate research. A brief explanation of each category is as follows:

I. FINDING AIDS & REFERENCE REPORTS

HAI inventoried and described the finding aids available for the Y-12 Mercury Task Force Files. Finding aids include two computer printouts of the Y-12 Mercury Database. These printouts are part of the Y-12 Mercury Task Force Files and are stored with them in the Y-12 Records Center vault. One printout is ordered by document/file number and the other is ordered alphabetically by author. These printouts are especially valuable since an electronic version of the Mercury Task Force Database no longer exists. Other finding aids described include the report, *Mercury at Y-12* (Y/EX-24), the bibliography of this report, which lists each document included in the collection, and a listing of the documents in a collection of unclassified materials that belong to the Y-12 Mercury Task Force Files. This collection is located in the DOE-OR Public Document Reading Room, 55 Jefferson Circle, Oak Ridge, TN, and at the Y-12 Plant, Building 9106, Room 41.

II. PROGRESS REPORTS

This category contains various reports that document the operations of the Y-12 Plant from the early 1950s to the mid-1970s. The bulk of the records represent the 1950s and the early 1960s, the period of greatest mercury use in the lithium isotope separation and enrichment processes.

III. MERCURY ACCOUNTABILITY RECORDS

Record series found under this heading relate to accounting and budgetary matters concerning mercury, in addition to shipping and receiving information, inventory and flasking information, and alloy and solvent loss in specific locations.

IV. HEALTH AND ENVIRONMENTAL RECORDS

The health and environmental group of records include health physics progress reports, records relating to urinalysis programs, records relating to air sampling programs for solvents and other materials, and records concerning the release and measurement of mercury within the environment.

Data Items in Record Series

Each record series description contain fifteen major pieces of information. Each of the fifteen is listed and further explained below.

Title and Inclusive Dates

Each record series description begins with a title that reflects the broad content of the record series and the inclusive dates of the records.

Location

Information on the physical location of the record series and an indication of its status, active or inactive, is provided here. Active records are necessary to conduct current business and are generally maintained in an office. Inactive records are those no longer needed for current business and are generally transferred to records storage areas for disposition. The Y-12 Mercury Task Force Files are located in the Y-12 Records Center vault.

Access Restrictions

Since most of the documents contained in the Y-12 Mercury Task Force Files are classified for national security reasons, access to the collection requires an individual to possess a DOE "Q" clearance and a demonstrated need to know. These requirements also hold for entrance to the Y-12 Records Center vault, where the collection is housed. For information on access to the Y-12 Mercury Task Force Files, researchers must first contact the custodian of the collection, Lowell L. McCauley, 615-574-7593.

The Y-12 Mercury Task Force Files were reviewed by the Y-12 Office of Classification to determine which documents could be released to the public based on current DOE guidelines. These documents were identified, recommended for public release, and sent to the DOE-OR Public Reading Room by Y-12 Information Management Services. The DOE-OR Public Reading Room is located at 55 Jefferson Circle. Copies of these unclassified materials are also located on the Y-12 Plant in Building 9106, Room 41. For information on viewing these collections at the DOE-OR Public Reading Room, contact Pam Buchanan, 615-576-1216. For information on viewing these documents onsite, contact Steve Wiley, Y-12 Health Studies Agreement Coordinator and Tennessee Oversight Agreement Coordinator, 615-576-0263.

For information regarding access to the Y-12 Records Center, contact Jack Lewis, Y-12 Records Manager, 615-576-8834.

Classified Information

To assist researchers and others in understanding the types of classified information, and the restrictions that govern access to it, the following excerpts from the DOE's *Understanding Classification* (June 1987) are provided:

Categories of Classified Information

There are three categories of classified information: Restricted Data; Formerly Restricted Data; and National Security Information.

1. RESTRICTED DATA (RD) is a special category of classified information with which the Department of Energy is principally concerned. The Restricted Data category is defined in the Atomic Energy Act as follows:

"The term RESTRICTED DATA means all data concerning (1) design, manufacture, or utilization of atomic weapons; (2) the production of special nuclear material; or (3) the use of special nuclear material in the production of energy, but shall not include data declassified or removed from the Restricted Data category pursuant to section 142."

2. FORMERLY RESTRICTED DATA (FRD) is information which has been removed from the Restricted Data category after the Department of Energy and the Department of Defense (DOD) have jointly determined that the information relates primarily to the military utilization of atomic weapons and can be adequately safeguarded in the same manner as National Security Information in the United States. This is known as transclassification. Such data may not be given to any other nation except under specially approved agreements.

3. NATIONAL SECURITY INFORMATION (NSI) is information which requires protection against unauthorized disclosure in the interest of the national defense or foreign relations of the United States and has been determined to be classified in accordance with the provisions of Executive Order 12356 or a prior Executive order.

Levels of Classified Information

There are three levels of classified information: Top Secret; Secret; and Confidential.

1. TOP SECRET is the level assigned to information of utmost importance to the national defense and security. Its unauthorized disclosure could reasonably be expected to cause *exceptionally grave damage* to national security.

2. SECRET is the level for information which, in the event of an unauthorized disclosure, could reasonably be expected to cause *serious damage* to national security.

3. CONFIDENTIAL is the level for information which, in the event of unauthorized disclosure, could reasonably be expected to cause *damage* to national security.

For further information, see also DOE Office of Safeguards and Security Headquarters, *Security Education Overview Handbook* (DOE/SA-0004).

Volume

An estimated volume of the records is given in linear feet and the exact number of file folders is provided as part of the record series description. One cubic foot is, on the average, equal to 24 file folders.

Accession/Other Identification Number

The Y-12 Mercury Task Force Files are organized according to a numerical filing system. Each file is numbered (1-853) and the number is preceded by an "M" for mercury. The number of each file for each record series is provided in sequential order as part of the record series description.

Condition

HAI judged the physical condition of the record series, categorizing them as either good, fair, or poor. If the records were judged to be in poor condition, an explanation is provided.

Container Number

Most records are stored in standard containers that hold one cubic foot of documents. In the case of the Y-12 Mercury Task Force Files, the container numbers represent file cabinet drawers. The Y-12 Mercury Task Force Files are contained in four legal-size filing cabinets secured by combination locks in the vault of the Y-12 Records Center. Drawer numbers are listed sequentially as part of the record series. Drawer 1: M1-M55; Drawer 2: M56-M109; Drawer 3: M110-M164; Drawer 4: M165-M230; Drawer 5: M231-303; Drawer 6: M304-M349; Drawer 7: M350-M402; Drawer 8: M403-M462; Drawer 9: no M-numbered files; Drawer 10: M463-M498; Drawer 11: M499-598; Drawer 12: 599-699; Drawer 13: M700-M853; Drawer 14: Y-12 Mercury Task Force Database Printouts.

Medium

The physical nature of the records, such as paper, microfilm, electronic, or audiovisual, is noted.

Scanning Suitability

HAI has provided a statement concerning the suitability of records for electronic scanning purposes. Factors which may effect scanning suitability, including paper size, weight, ink and paper colors, type font, and the presence of handwritten data, graphics, diagrams, and photographs are noted under this heading. Depending on the state-of-the-art in scanning technology, this statement may not be accurate in the future.

Duplication

As part of a classification review of the records in the Y-12 Mercury Task Force Files, all originally unclassified records were copied and placed in the DOE-OR Public Document Reading Room, 55 Jefferson Circle, 615-576-1216. Copies of these originally unclassified documents are also located on the Y-12 Plant in Building 9106, Room 41.

Arrangement

The arrangement of the record series, for example, numerical, chronological or alphabetical, is described when possible. The Y-12 Mercury Task Force Files are arranged by a numerical filing system. Each file is numbered (1-853) and the number is preceded by an "M" for mercury.

Originating Office

The originating office of the organization (e.g., Health Physics Department, Radiation Safety Division, or Union Carbide Company) which produced the records is provided here. In some cases, as in Technical Reports, Technical Memoranda, and Quarterly Reports, for example, several organizational departments and divisions contributed documents to the record series, and the term "various departments and divisions" is used.

Finding Aids

If finding aids exists, they are described.

Disposition Authority

Disposition authorities cited refer to the NARA General Records Schedules and DOE Records Schedules. Since this is a permanent collection, disposition authority is not applicable.

Data Elements

The data elements, which are similar to key words, that HAI considered pertinent to the record series are listed in numerical order. The numbers correspond to the revised data elements list (see Appendix A).

I. FINDING AIDS & REFERENCE REPORTS

Mercury At Y-12: A Study of Mercury Use at the Y-12 Plant, Accountability, and Impacts on Y-12 Workers and the Environment-1950 to 1983

Location: 1. Active: Records Center, Y-12 Plant, Oak Ridge, TN
2. Inactive: ✓

Access Restrictions: Unclassified version (Y/EX-24) *Volume:* 1 volume, 415 pages

Accession or Other ID Number: N/A *Condition:* Good

Container Numbers: N/A *Medium:* Paper

Scanning Suitability: Suitable *Duplication:* DOE Public
Reading Room, 55 Jefferson
Circle, 615-576-1216

Arrangement: N/A

Originating Office: 1983 Mercury Task Force

Finding Aids: N/A

Disposition Authority: Permanent Collection

Series Description: *Mercury At Y-12: A Study of Mercury Use at the Y-12 Plant, Accountability, and Impacts on Y-12 Workers and the Environment-1950 to 1983* is the final report of the 1983 Mercury Task Force. It provides a history of lithium isotope separation and a detailed discussion of the mercury material accountability at Y-12. The report also furnishes summaries of the health studies performed on Y-12 workers exposed to elevated concentrations of mercury toxicity and efforts by Y-12 to monitor the workplace for mercury contamination and safeguard workers against mercury toxicity. The report also summarizes studies of the environmental impact of mercury toxicity. The bibliography provides a document-level inventory and description of the Y-12 Mercury Task Force Files.

Data Elements: N/A

DOE-OR Public Reading Room Collection, 1994

Location: 1. Active: 55 Jefferson Circle, Oak Ridge, TN
2. Inactive:

Access Restrictions: Unclassified

Volume: ~~530~~ ⁵³⁰ File Folders;
~~10.0~~ linear feet

Accession or Other ID Number: Y/HG-0001-Y/HG-~~0386~~⁰⁵³⁰

Condition: Good

Container Numbers: N/A

Medium: Paper

Scanning Suitability: Suitable

Duplication: Y-12 plant-site,
Building 9106, Room 41

Arrangement: Numerical by file code

Originating Office: Various Y-12 departments and divisions

Finding Aids: For a current list of these documents, contact Steve Wiley, Y-12 Health Studies Agreement Coordinator and Tennessee Oversight Agreement Coordinator, 615-576-0263.

Disposition Authority: Permanent Collection

Series Description: The DOE-OR Public Reading Room Collection is an assembly of unclassified documents that are part of the Y-12 Mercury Task Force Files, the bulk of which are classified. These documents were identified by the Y-12 Office of Classification, reviewed to verify their unclassified status, recommended for public release, and sent to the DOE-OR Public Document Reading Room by Y-12 Information Management Services. The arrangement of the files that contain these documents does not parallel the arrangement of the Y-12 Mercury Task Force Files, but rather reflects the order of the release of the document. The series contains a variety of documents from the Y-12 Mercury Task Force Files pertaining to mercury accountability data, environmental monitoring and analysis, chemical properties of mercury, worker urinalysis programs, air solvent monitoring and analysis reports, progress reports of various departments and divisions, and relevant correspondence.

Data Elements: N/A

Y-12 Mercury Task Force Data Base Printouts ✓

Location: 1. Active: Y-12 Records Center, Building 9711-5, Room 106
2. Inactive:

Access Restrictions: Secret/RD

Volume: 0.5 linear feet

Accession or Other ID Number: N/A

Condition: Good

Container Numbers: Drawer 14

Medium: Paper

Scanning Suitability: Suitable

Duplication: Information is contained in the bibliography of the *Mercury at Y-12*, see page 9
(Y/EX-24)

Arrangement: One printout is arranged by file number, the other printout is arranged alphabetically

Originating Office: ^{June} 1983 Y-12 Mercury Task Force

Finding Aids: This is a finding aid to the classified mercury collection

Disposition Authority: Permanent Collection

Series Description: As a result of the 1983 Y-12 Mercury Task Force's investigation of mercury use at Y-12 since the early 1950s, hundreds of documents were collected and organized into what is now known as the Y-12 Mercury Task Force Files. Information concerning these documents was entered into an electronic database, which subsequently has been lost. These two printouts of the information contained in the database are the only existing record of the database. They serve as useful guides to the contents of each file in the collection.

Data Elements: N/A

II. PROGRESS REPORTS

Alloy Division Monthly Progress Reports, 1955-1961 ✓

Location: 1. Active:
2. Inactive: Y-12 Records Center, Building 9711-5, Room 106

Access Restrictions: Secret/RD

Volume: 63 File Folders;
2.14 linear feet

Accession or Other ID Number: M432, M610-
611, M615-617, M619-620, M624-625, M628-629,
M630-631, M636-637, M639-645, M647-650,
M653, M655, M657-659, M661-667, M669-689

Condition: Good

Container Numbers: Drawers 8, 10, 13

Medium: Paper

Scanning Suitability: Suitable

Duplication: May be part of the
unclassified collection, see
statement on page 12

Arrangement: Numerical by file code

Originating Office: Alloy Division

Finding Aids: Y-12 Mercury Task Force Database Printout; *Mercury at Y-12* (Y/EX-24)
Bibliography

Disposition Authority: Permanent Collection

Series Description: This record series consists of the monthly progress reports of the Y-12 Alloy Division. These reports summarized and expanded upon the weekly progress reports of the Alloy Division's production of lithium deuteride through the Colex, Elex, and Aspen operations. Reports are divided into four sections: 1) Colex operation, 2) Elex operation, 3) finishing and fabrication process, and 4) Aspen chemical. The Colex section generally contains information on Alpha 4 and Alpha 5 cascades, auxiliary processes such as the evaporation of chlorides, acid washes with mercury, use of scrubbers, raw feed salt practices, and construction of new facilities and equipment. The Elex section provides similar information on the Beta 4 cascade. Information concerning the finishing and fabrication process included production of lithium deuteride and activities of the wet chemistry facility and reduction facility. The section on the Aspen chemical process provides information on the production of lithium deuteride, grinding and loading molds, pressing materials, and rubber fabrication.

Data Elements: 88

Alloy Division Weekly Progress Reports, 1955-1959 ✓

Location: 1. Active:
2. Inactive: Y-12 Records Center, Building 9711-5, Room 106

Access Restrictions: Secret/RD

Volume: 29 File Folders;
1.2 linear feet

Accession or Other ID Number: M433, M435-
436, M483, M485-486, M492, M604-607,
~~M909~~, M612-614, M620-623, M626-627,
M632-635, M638

Condition: Good

Container Numbers: Drawers 8, 10, 12

Medium: Paper

Scanning Suitability: Suitable

Duplication: May be part of
the unclassified collection, see
statement on page ~~12~~
13

Arrangement: Numerical by file code

Originating Office: Alloy Division

Finding Aids: Y-12 Mercury Task Force Database Printout; *Mercury at Y-12* (Y/EX-24)
Bibliography

Disposition Authority: Permanent Collection

Series Description: This record series consists of the weekly progress reports of the Y-12 Alloy Division for 1955-1959. These reports provide detailed descriptive information on the lithium deuteride production in the Colex and Elex operations and the Aspen chemical process. The use of mercury, except in the acid wash procedure, is not widely discussed in these reports. The general outline of the report consists of sections on Beta Operations, Alpha Operations, and the Aspen chemical process. Under each section the following topics are described: (Beta) wet chemistry, reduction, cascades, and other operations; (Alpha) cascades, mercury sets for acid wash, construction of new facilities and equipment; (Aspen) production of lithium deuteride.

Data Elements: 88

Quarterly Technical Progress Report Y-12 Plant, 1959-1975

Location: 1. Active:
2. Inactive: Y-12 Records Center, Building 9711-5, Room 106

Access Restrictions: Secret/RD

Volume: 15 File Folders;
0.625 linear feet

Accession or Other ID Number: M14, M15 (5 to 7-63),
M226-227, M229, M230-231
1961-68 1968 1969-75

3059
M15 (5 to 7-63)
(8/64) 1963-67
M-14, M-231
(1969)
ND Air or
H₂O Hg esnc's

Condition: Good

Container Numbers: Drawers 1-3

Medium: Paper

Scanning Suitability: Suitable

Duplication: May be part of the
unclassified collection, see
statement on page 12
13

Arrangement: Numerical by file code

Originating Office: Development Division

Finding Aids: Y-12 Mercury Task Force Database Printout; *Mercury at Y-12* (Y/EX-24)
Bibliography

Disposition Authority: Permanent Collection

Series Description: Y-12 Quarterly Technical Progress Reports contain both summary and detailed reports of various processes, programs, problems, and studies from 1959-1975. General topics include chemical engineering-plant studies; reports on the Orex, Elex, and Colex pilot studies; reports on special problems; developments in lithium, ceramics, and plastics processing and fabrication; developments in lithium chemistry; developments in electrochemical separation, lithium hydride and deuteride processing and development; metallurgy, nuclear, and thermonuclear studies; development of instruments for engineering and physics; developments in functional and analytical chemistry; and developments in radiation safety and criticality control.

Data Elements: 81, 88, 114

more technical than monthlies
no envn. monitoring data

Technical Division Monthly Progress Reports, 1955-1958

(PV) 1955 only

Location: 1. Active:
2. Inactive: Y-12 Records Center, Building 9711-5, Room 106

Access Restrictions: Secret/RD

From M-9 on
can read off graph
(No numbers only)
trend lines

Volume: 47 File Folders;
1.95 linear feet

Accession or Other ID Number: M1-M13, M94-104
M105-117, M142-1523
..(1957) (1958)

✓ M-111 (1/57)
✓ M-148 (1/58)

Condition: Good

Container Numbers: Drawers 1-3

Medium: Paper

Scanning Suitability: Text is suitable for scanning; photographs may not be suitable.

Duplication: May be part of the unclassified collection, see statement on page 12
13

Arrangement: Numerical by file code

Originating Office: Technical Division

Finding Aids: Y-12 Mercury Task Force Database Printout; *Mercury at Y-12* (Y-EX-24) Bibliography

Disposition Authority: Permanent Collection

Series Description: The Technical Division Monthly Progress reports contain both brief summaries and detailed reports on general accounting and business activities at Y-12; design and construction of new buildings, work areas, and equipment; mechanical inspection of work areas, processing equipment, instruments; project, chemical, industrial, civil, architectural, electrical, and instrumental engineering; alpha air monitoring; product analysis; chemical processing and reduction, including mercury; technical development involving alloy production, chemical processing and reduction, metal fabrication and processing and aspen fabrication; the development of isotope separation; and metal fabrication and processing. Detailed descriptions of mercury use are found in sections describing lithium deuteride fabrication and specification, the physical chemistry of lithium deuteride, and the safety and security of incoming and outgoing mercury.

Data Elements: 3, 88, 103, 118, 120, 123, 124

DRAFT

II. PROGRESS REPORTS

20

*Note: also Paul got monthly conc.
in EFPC in these
for 1955*

Technical Memoranda, 1953-1982 ✓

Location: 1. Active:
2. Inactive: Y-12 Records Center, Building 9711-5, Room 106

Access Restrictions: Confidential/RD, Secret/RD

Volume: 73 File Folders;
3 linear feet

Accession or Other ID Number: M205-207,
✓ M240-243, M417-418, M421, M438-443,
✓ M524, M529-584, M810-814
↑ U extraction (no Hg)
↑ Y/B-92/20 Waste Disposal at Y-12 (missing)

Condition: Good

Container Numbers: Drawers 4-5, 8, 11, 13

Medium: Paper

Scanning Suitability: Suitable

Duplication: May be part of
the unclassified collection, see
statement on page 12/13

Arrangement: Numerical by file code

Originating Office: Various Y-12 departments and divisions

Finding Aids: Y-12 Mercury Task Force Database Printout; *Mercury at Y-12* (Y/EX-24)
Bibliography

Disposition Authority: Permanent Collection

compilations of memoranda
letter memoranda
YFC- OR
date only

Series Description: Technical memoranda, in contrast to technical reports, are short reports, summaries, histories, and chronologies on specific topics, such as summaries of meetings and conferences concerning the lithium isotope separation, enrichment, and purification processes; summaries and reports of long range plans on lithium separation and lithium enrichment processes; histories of the Colex, Orlex and Elex processes and pilot plants; and reports on environmental monitoring and contamination of the creeks, rivers, and streams near the Y-12 plant.

↑ Lowe data M-584

4, (optimization studies)
L-5 history M-207
L-4, S history M-814

Data Elements: 88, 114, 117

Technical Reports, 1953-1982 ✓

Location: 1. Active:
2. Inactive: Y-12 Records Center, Building 9711-5, Room 106

Access Restrictions: Unclassified, Confidential/RD,
Secret/RD

Volume: 45 File Folders;
1.875 linear feet

Accession or Other ID Number: ✓ M17-18, M23, M54,
✓ M59, M69, M70, M80-81, M85, M90-93, M105,
✓ M118, M120, M154-155, M158-159, M207,
M239, M442, M458, M740, M742-744, M754-755,
M757, M760, M763, M770-772, M778, M786,
M788, M790-791, M794-795, M799
✓ 119 ✓

Condition: Good

Container Numbers: Drawer 1-5, 8, 11, 13

Medium: Paper

Scanning Suitability: Suitable

Duplication: May be part of
the unclassified collection, see
statement on page 12
13

Arrangement: Numerical by file code

Originating Office: Various Y-12 departments and divisions

Finding Aids: Y-12 Mercury Task Force Database Printout; *Mercury at Y-12* (Y/EX-24)
Bibliography

Disposition Authority: Permanent Collection

published numbered:
bound with cover Y/DK-
Y would be found
in Technical
library

Series Description: This record series consists of technical reports that cover various topics relating to the lithium isotope separation and enrichment processes and the monitoring of mercury contamination. This series contains two subseries based on the following topics:

Technical Reports, 1953-1982 (continued)

Series Description (continued)

- M-23
- 1) Instructions, procedures, and instrumentation for the Colex, Orex, and Elex processes and instruments and chronologies of lithium separation in buildings 9201-4 and 9201-5: This subseries contains reports on lithium amalgams; reports on the properties of lithium isotopes including a refrigeration system; reports on physical properties of mercury at various temperatures; status and final reports on the isotope separation process in buildings 9201-4 and 9201-5; reports on experiments involving lithium isotope separation and purification in buildings 9201-4 and 9201-5; specifications for mercury storage flasks; reports on chemical inventories; and, inspection reports of lithium processing facilities.
 - 2) This is way overstated ↴
M-17
(Hg vapor detector)
?
2) Monitoring of mercury contamination: This subseries includes reports on mercury discharges into the rivers and streams surrounding Y-12 and the East Fork Poplar Creek; reports on personnel exposed to mercury at various work locations in buildings 9201-4 and 9201-5; reports on design and development of instruments used in the lithium processing and monitoring for mercury contamination; reports on decontamination of buildings involved in lithium processing; incident reports involving mercury; reports on the portable mercury vapor detector; reports on mercury levels in the New Hope Pond; ecological and environmental reports on mercury; and, reports on deuterium and heavy water. ?

Data Elements: 1, 3, 88, 114, 115, 117, 120, 124

MISSING M-59 → correspondence file 1971-75 (81-10)
and shipping, storing, flaking
59 Hg physical properties
69 tails/feed ratios (1959-61)
70 1962-63 (9720-26)
* 80 81-10 procedure; efficiency study!; Y/HG-360 HNO₃ wash
81 flaking 1956-61 process equip info. Hg recovery
85 procedure

* 90 Status Report FY 584
* 93 " 585
* 442 FY 53

Y-12 Plant Quarterly Report, 1952-1981 ✓

(PV) 1952
1953
1954
1955 only

Location: 1. Active:
2. Inactive: Y-12 Records Center, Building 9711-5, Room 106

Access Restrictions: Secret/RD

Volume: 118 File Folders;
4.92 linear feet

Accession or Other ID Number: M19, M24-39, ✓✓✓
✓ M86-89, M121-141, ~~M153~~, M160-189, M190-191, series stopped reporting
M194, M197, M232-233, M235-238, M690-721 bldg. 2n in 1961 Oct. Condition: Good
H₂O reporting: NO Hg conc. numbers
≥ M-141 (3/63) (M-140=last one) pH + flow only

Container Numbers: Drawers 1-5, 12-13

Medium: Paper

Scanning Suitability: Text is suitable for scanning; graphs, tables, charts, and photographs may not be suitable.

Duplication: May be part of the unclassified collection, see statement on page 12
13

Arrangement: Numerical by file code

Originating Office: Various divisions within the Y-12 plant contributed to the reports.

Finding Aids: Y-12 Mercury Task Force Database Printout; *Mercury at Y-12* (Y/EX-24) Bibliography

Disposition Authority: Permanent Collection

13 reports of 120

Series Description: Quarterly reports contain both detailed and summarized information on the activities at Y-12 plant. Reports describe chemical processes, business activities, security concerns, worker protection measures, and monitoring programs. Information specific to mercury is found in sections concerning production and fabrication of lithium deuteride, employee and plant protection, and process development. The employee and plant protection section describes monitoring of mercury exposure and release, including sampling of the plant's water supply and Poplar Creek (measurements reported in gallons/day). Workers exposed to mercury are reported as the number of workers sampled and the percentage of workers exposed. The number of air samples and smears are reported for each quarter and results are given in parts per million (ppm) and milligrams/cubic meter (mg/m³). Mercury vapor air concentrations, reported in mg/m³ for buildings 9201-4 (Alpha-4) and 9201-5 (Alpha-5) only? no include the number of samples and the percentage of samples that gave abnormal or elevated results. Process development measures are described to improve mercury monitoring and ways to prevent loss of material in mercury recovery. Most quarterly reports also contain photographs of instruments, processing machinery and equipment, buildings, waste storage and treatment areas, and plant grounds.

Data Elements: 3, 38, 40, 42, 45, 68, 75, 81, 83, 88, 102, 103, 107, 114, 117, 118, 124

DRAFT

II. PROGRESS REPORTS

also: bldgs 81-10
9808

24

Note: monthly ~~avg~~ are shown for
each quarter
(current & previous)

III. MERCURY ACCOUNTABILITY RECORDS

Alloy and Mercury Solvent Loss Study for Alpha 5, October 1957 ✓
and Monthly Tabulations of Sump Losses, April 1957 - April 1959

Location: 1. Active:
2. Inactive: Y-12 Records Center, Building 9711-5, Room 106

Access Restrictions: Confidential/RD

Volume: 1 File Folder;
0.04 linear feet

Accession or Other ID Number: M47

Condition: Good

Container Numbers: Drawer 1

Medium: Paper

Scanning Suitability: Suitable

Duplication: May be part of
the unclassified collection, see
statement on page 12
13

Arrangement: Numerical by file code

Originating Office: Division unknown

Finding Aids: Y-12 Mercury Task Force Database Printout; *Mercury at Y-12* (Y/EX-24)
Bibliography

Disposition Authority: Permanent Collection

Series Description: This series of records constitutes a study that examines the origin of mercury alloy and mercury solvent loss from Alpha 5 (Building 9201-5) cascade. It describes the cascade system, the sump tanks, and the waste tanks. Sampling procedures for the sump and waste tanks are provided along with the metals found during analysis of liquid waste contents. The amounts of mercury lost are given in pounds and associated mercury costs. The study includes a diagram of the Alpha 5 cascade. Correspondence pertaining to the study is included in the file.

Data Elements: 88, 89, 115, 120, 119?

= Y/HB-347 UCNI
will be sanitized (2/1/94)

IV. HEALTH AND ENVIRONMENTAL RECORDS

Bio-Analytical Control Sample Results, 1974

✓ Include this with Hg in water data

Location: 1. Active:

2. Inactive: Y-12 Records Center, 9711-5 Room 106

Access Restrictions: Secret/RD

April 1973 U,W
Oct 1973 W
April 1974 W
Oct 1974 W
w Am 75 Oct 1975 W

Oct 1976 W
July 1977 W
Jan 1978 W

Oct 1981⑩
July 1982⑪

Volume: 1 File Folder;
0.24 linear feet

Accession or Other ID Number:

M511

Condition: Good

Container Numbers: Drawer 11

Medium: Paper

Scanning Suitability: Suitable

Duplication: May be part of
the unclassified collection, see
statement on page 12
13

Doesn't identify
source of H₂O
sample.

Arrangement: Numerical by file code

Originating Office: Division unknown

Finding Aids: Y-12 Mercury Task Force Database Printout; *Mercury at Y-12* (Y/EX-24)
Bibliography

The purpose of these extracted pages is
Quarterly Hg in water measurements:

Disposition Authority: Permanent Collection

Only 3 of 10 pages is about urinalysis, April-June 1974, Oct-Dec 1981, July-Sept 1982

Series Description: This record series contains laboratory measurements with a chart (several pages) of measurements of various nuclides to which workers were exposed. The chart provides the quantity of nuclide and the type of analysis used to determine the amount of exposure. Types of analysis include: thermoluminescent dosimetry (TLD), urinalysis, or colorimetric. Urinalysis was used to determine exposure to uranium and mercury. TLD was used to determine beta/gamma dosage, and exposure to radioactive magnesium, lithium deuteride, lithium hydride, and thorium. Colorimetry was used to determine airborne exposure conc. of thorium. On 1 page only

Data Elements: 59, 68, 114

on 2 pages only

NO EXPOSURE DATA:
only analytical

results of metal and
water samples for "L, M+N"

on 2 pages only

3 pages only

manganese + nickel
manganese + lead +
nitrogen

Health Physics Hygiene Progress Reports, 1949-1953

Location: 1. Active:
2. Inactive: Y-12 Records Center, Building 9711-5, Room 106

Access Restrictions: Unclassified

Volume: 8 File Folders;
0.33 linear feet

Accession or Other ID Number: M453, M494
(2 files with this number), M495-M499

Y/HG-136 ✓ M-493
Y/HG-197
Y/HG-0068
④

Condition: Good

Container Numbers: Drawer 10

Y/HG-0069 M-495
- 198 M-496
- 135 M-498

Medium: Paper

Scanning Suitability: Suitable

Duplication: May be part of
the unclassified collection, see
statement on page 12
13

Arrangement: Numerical by file code

Originating Office: Health Physics Division

Finding Aids: Y-12 Mercury Task Force Database Printout; *Mercury at Y-12* (Y/EX-24)
Bibliography

Disposition Authority: Permanent Collection

Series Description: This record series contains monthly, bi-monthly, and semi-annual reports of the activities of the Oak Ridge Health Physics Division. Reports describe, quantitatively and qualitatively, surveys for beryllium and mercury vapor conducted throughout the Oak Ridge Reservation (X-10, Y-12, and K-25). Substances surveyed are uranium, beryllium, and mercury. These are surveys of air, water, sewage, buildings, and the containers and contents of incoming and outgoing shipments. Uranium, beryllium, and mercury levels in the air are reported in milligrams/cubic meter (mg/m^3) and uranium, beryllium, and mercury levels in water and sewage are reported in parts per million (ppm). A filtration paper system for air sampling is described. Neutron film badge results are given in millirems/day (mr/day) for personnel monitoring. Reports also describe monitoring instrumentation, calibration of instrumentation, and site survey activities.

Data Elements: 88, 114, 81, 93, 124

Jan 1949 Part IV-Hg went to site survey 1-49. p.11
p.9
May 1949 9203, 9206, 9211, 9720-5, 9731,
9733-3, 9737
Nov/Dec 1950 9733-3, 9720-5 (whoused)

Bldgs: 9206
9706-2
9720-5
9733-3
9737

DRAFT

IV. HEALTH AND ENVIRONMENTAL RECORDS

34

July - Dec 1951

9201-2, 9733-2

Jan - July 1952

?

Jan - June 1953

?

Mercury Losses to East Fork Poplar Creek, 1955-1982 ✓

Summary

Location: 1. Active:
2. Inactive: Y-12 Records Center, 9711-5 Room 106

Access Restrictions: Unclassified

Accession or Other ID Number: M491 ✓

Container Numbers: Drawer 10

Scanning Suitability: Suitable * see MS11 on p. 33

Volume: 1 Folder; 0.04 linear feet

Condition: Good

Medium: Paper

Duplication: May be part of the unclassified collection, see statement on page 12
13

Arrangement: Numerical by file code

Originating Office: Division unknown

Finding Aids: Y-12 Mercury Task Force Database Printout; Mercury at Y-12 (Y/EX-24) Bibliography

Disposition Authority: Permanent Collection

Series Description: This record series contains letter reports and correspondence on mercury losses to the East Fork Poplar Creek for the period 1955-1982. The losses are reported in pounds and parts per million.

Data Elements: 118, 122

Mercury Urinalysis Records, 1954-1983 ✓

Location: 1. Active:
2. Inactive: Y-12 Records Center, Building 9711-5, Room 106

Access Restrictions: Privacy Act

Volume: 9 File Folders;
0.375 linear feet

Accession or Other ID Number: M372, M465,
~~M466, 19-7-6, 20-9-18, M511~~,
~~+ 0.1. 20-9-16 000~~,
~~really~~

Condition: Fair

Container Numbers: Drawer 7, 9-10
BOXES

Medium: Paper

Scanning Suitability: Generally unsuitable for scanning; record series consists predominantly of computer printouts of monitoring reports and lists of names of program participants. Textual portions of the series, however, may be suitable for scanning.

Duplication: May be part of the unclassified collection, see statement on page 12
B

Arrangement: Numerical by file code

Originating Office: Radiation Safety, Health Physics, and Industrial Hygiene

Finding Aids: Y-12 Mercury Task Force Database Printout; *Mercury at Y-12* (Y/EX-24) Bibliography

Disposition Authority: Permanent Collection

Series Description: This record series contains mercury urine monitoring program records, including lists of participating employees providing the name, badge number, department number, building number, and shift information for buildings 9201-2, 9201-4, 9201-5; mercury urine control records; schedules for tests; and the results of the tests in milligrams/liter (mg/l); and correspondence pertaining to program procedures.

Data Elements: 8, 16, 31, 68

Poplar Creek Water Analysis, 1954-1960 ✓
(aka SW. Sampling)

Location: 1. Active:
2. Inactive: Y-12 Records Center, Building 9711-5 Room 106

Access Restrictions: Unclassified

1856 18-10-4, 18-10-4, 18-(file folder has incomplete number) 18-10-4

(4) Accession or Other ID Number: M488, 1955, 1956, 1957-6, 1958

Silvert wine

one folder from box

chk'd out (1955)

p.c.r. analysis (1955)

Y/HG-0055 0196

*dates 2 = 1955
1956
1958*

*(1955) monthly
(1958) monthly*

Volume: 5 Folders; 0.2 linear feet

Condition: Fair

Medium: Paper

Container Numbers: Drawer 9, 10

Scanning Suitability: Suitable

Duplication: May be part of the unclassified collection, see statement on page 12
13

Arrangement: Numerical by file code

Originating Office: Industrial Hygiene, Health Physics, and Nuclear Radiation Safety

Finding Aids: Y-12 Mercury Task Force Database Printout; *Mercury at Y-12* (Y/EX-24) Bibliography

Disposition Authority: Permanent Collection

Series Description: This record series relates to sampling of surface water of Poplar Creek, Bear Creek, and the SE, NE, and NW settling pits. Correspondence relating to monitoring and letter reports are included. Sampling data includes the date of sample, alpha and beta measurements in microcuries/cubic centimeter (mc/cc), mercury measurement in milligrams/liter (mg/liter), and the total flow of waste into the river from setting tanks SE, NE, and NW (gallon/wk). The letter reports provide information on the average radioactivity in the East Fork Poplar Creek for the period 1954-1959. Radioactivity is reported for alpha and beta activity disintegrations/minute/liter (d/m/l) and mercury in mg/liter (mg/l). Total flow of effluents into the East Fork Poplar Creek is measured in gallons/week (gal/wk). Information is provided about the content of waste materials in settling tanks SE, NE, and NW.

dates?

Data Elements: 118, 124

Medical, Health and Safety (1972)
Radioactive Effluent Report 1972 ✓
a correspondence file

Location: 1. Active:
2. Inactive: Y-12 Records Center, Building 9711-5, Room 106

Access Restrictions: Confidential/RD

Volume: 1 File Folder; 0.24 linear feet

Accession or Other ID Number: M489 , M460
(974)

Condition: Good

Container Numbers: Drawer 10

M462 1965-68 Environmental folder
M459 1971 Medium: Paper
M458 1972

Scanning Suitability: Suitable

Duplication: May be part of the unclassified collection, see statement on page 12
13

Arrangement: Numerical by file code

Originating Office: Health Physics Department

Finding Aids: Y-12 Mercury Task Force Database Printout; *Mercury at Y-12* (Y/EX-24) Bibliography

Disposition Authority: Permanent Collection

to hot many intate

Series Description: This record series contains correspondence and a final report regarding an investigation of employee injuries and exposures at Building 9212. The correspondence covers a wide range of monitoring programs at Y-12 mainly for exposure to uranium. Two documents pertain specifically to mercury: 1) the declassification of mercury materials for the overall study, and 2) a memorandum calling for a task force study on mercury material accountability. No measurements of mercury are provided. The series also contains nonrecord material from the Environmental Protection Agency.

unrelated data? ← OK ← Y/HG S. / no not here now

Data Elements: 81, 118, 124

APPENDIX A
INFORMATION REQUIRED BY THE DEPARTMENT OF ENERGY FOR
EPIDEMIOLOGIC AND HEALTH STUDIES (ORIGINAL)

DATA PERTAINING TO CONTRACTOR ORGANIZATIONS

Any type of materials that will help understand the functional organization of the contractor, or to identify individuals who may have had responsibility for operations within a facility. These types of materials are useful when studying a facility because they enable the researcher to identify key personnel who were involved with certain projects and to contact these persons, when necessary, to help understand the nature of the plant operations and potential exposures that occurred in specific areas of the plant. Examples of records that may meet these needs are:

- 1 Contractor Organizational Charts
- 2 Contractor Organizational Histories/Plant Information Packets
- 3 Mission Statements for Functional Units
- 4 Contractor Personnel Directories/Telephone Directories
- 5 Copy of all Position Descriptions and Effective Dates
- 6 Diaries, Subject Files, and Correspondence of the Facility Director

DATA PERTAINING TO INDIVIDUALS

Identification

Epidemiologic studies of workers require the creation of lists of individuals at each facility who will be included in the study. Therefore, all records containing identifying information for employees at a specific facility are of great value. These records will typically be from personnel or payroll departments and may include the following data:

- 7 Social Security Number
- 8 Name (last, first, middle)
- 9 Maiden Name
- 10 Other Names
- 11 Address (city, state, zip)
- 12 Spouse Name (last, first, middle)
- 13 Spouse Address (street, city, state)
- 14 Emergency Contact (last, first, middle, relationship)
- 15 Emergency Contact Address (street, city, state)
- 16 Employer Identification Numbers (payroll, annuity, badge, etc.)

Demographic Information

In order to compare the characteristics of the worker population with other groups, it is desirable to know the following information:

- 17 Birth Date
- 18 State (or Country) of Birth
- 19 City of Birth
- 20 Sex
- 21 Race
- 22 Education (highest degree)
- 23 Marital Status

Work History

Work records indicating the type of jobs performed over specific periods of time are extremely useful. Specific data items are as follows:

- 24 Hire Date at Facility
- 25 Last Termination Date at Facility
- 26 Reason for Termination (medical, disability, etc.)
- 27 Type of Employee (hourly, salaried, etc.)
- 28 Occupation or Job Title (all jobs titles held and associated duties)
- 29 Organization Assignments (building and/or department assignments)
- 30 Previous Work History (list of all previous employers and job titles/duties)
- 31 Work Location (facility-specific)
- 32 Military Service (branch of military, dates served, and service number)
- 33 Health-Related Leaves, Reassignments, Work Restrictions
- 34 Performance Appraisals

Medical Data

Medical records, records of treatment, incident or accident report, and company health insurance records may be useful for epidemiologic studies. Examples of the information that may be used from these records include:

- 35 Pre-Employment Periodic or Special Physicals, Including Lab Test Results
- 36 Smoking History
- 37 Alcohol/Beverage History
- 38 Pre/Post Employment Injuries/Accidents
- 39 Exposure History for Hazardous Materials
- 40 Sick Leave Records
- 41 Return to Work Examinations
- 42 Pathological Reports
- 43 Familial Illness or Mortality History
- 44 Drug/Medication Use History
- 45 Diagnostic X-rays (dental, chest, other)
- 46 Predisposing Diseases
- 47 Disease History

- 48 History of use of DTPA for Chelation
- 49 Incident or Accident Reports
- 50 Company Health Insurance Records
- 51 Workers' Compensation Claims
- 52 Identifying Information that Allows Linkage of Medical Records to Employment Record Data (i.e., name, payroll number, social security number, birth date, etc.) and to Facilities (building name, etc.)

Mortality Data (any type of information concerning death)

Many studies compare death rates in worker populations with rates in other populations. The following data items are useful:

- 53 Death Certificate
- 54 Date of Death
- 55 Cause of Death (including all listed causes and contributory conditions)
- 56 Place of Death (city, state)
- 57 Payment of a Death Benefit and Date
- 58 Vital Status at Last Known Date

External Radiation

External radiation exposure records that pertain to individual workers or to individual areas in a plant must be retained. Types of data items contained on these records are:

- 59 Estimated Whole Body Dose Due to X and Gamma Rays
- 60 Estimated Whole Body Dose Due to Neutrons
- 61 Estimated Whole Body Dose Due to Tritium
- 62 Estimated Total Whole Body Dose
- 63 Individual Film Badge Records
- 64 Individual Thermoluminescent Dosimeter Records
- 65 Partial Body or Skin Doses
- 66 Date of Each Known Exposure or Reading
- 67 Identifying Information that Allows Linkage of the External Radiation Records to Employment Record Data (i.e., name, payroll number, social security number, birth date, etc.) and to Facilities (building name, etc.)

Internal Radiation

Internal radiation exposure records for workers must be retained. Types of data items contained on these records are:

- 68 Urinalysis Testing for Radionuclides (date, indication of radionuclide, results and units)
- 69 Portal of Entry (for each radionuclide)
- 70 Analysis Type (urinalysis, whole body count, fecal analysis, etc.)
- 71 Whole Body Counting Data
- 72 Date of Each Known Exposure or Test
- 73 Any Record Confirming a Deposition

- 74 Identifying Information that Allows Linkage of the Internal Radiation Records to Employment Record Data (i.e., name, payroll number, social security number, birth date, etc.) and to Facilities (building name, etc.)

Industrial Hygiene

Chemical Exposures

Data generated to evaluate occupational exposure levels and to demonstrate compliance with exposure limits should be systematically retained. The types of records of data that should be retained may include:

- 75 Individual Blood or Urinalysis Records for Specific Chemicals (mercury, lead, etc.)
- 76 Dates of Exposures
- 77 Environmental Monitoring Data Relating to Specific Work Locations and Jobs
- 78 Concentration Readings
- 79 Sample Type (blood, urinalysis, fecal, breathing zone, general air, etc.)
- 80 Results of Units (mg/ml, ppm, mg/cubic meter)
- 81 Monitoring Characteristics (devices, times, control data, frequency, techniques, etc.)
- 82 Identifying Information that Allows Linkage of the Chemical Exposure Records to Employment Record Data (i.e., name, payroll number, social security number, birth date, etc.) and to Facilities (building name, etc.)

Physical Agents

Data generated to evaluate occupational exposure levels and to demonstrate compliance with exposure limits should be systematically retained. Such data should include:

- 83 Hazard Inventories of Potentially Health Hazardous Physical Agents (noise, laser light, electromagnetic radiation, magnetic fields, etc.)
- 84 Location and Date of the Inventory
- 85 Work Place or Area of Survey Results along with Exposure Levels
- 86 Equipment and Methods Used to Assess Hazard
- 87 Identifying Information that Allows Linkage of the Exposures to Physical Agents to Employment Records, to Medical Information and to Facilities

DATA PERTAINING TO FACILITIES

Area/Site Monitoring Information (by job category, year, building, etc.)

Other records that relate to the calibration, sensitivity, type, location of the equipment used for personnel monitoring, surveying, air sampling, etc., are quite useful, especially if they can be linked to specific processes, areas, buildings, and personnel. Information describing the general requirements followed by the facility for the provision of various personnel monitoring equipment, examinations, or testing is also desirable. Examples of these types of records include the following:

- 88 Chemical or Other Processes, by Year and Building
- 89 Hiring, Materials Handling, and Other Practices

- 90 Medical Examination Requirements for Employment/or Employment in Specific Jobs
- 91 Requirements for Wearing Dosimeters
- 92 Decontamination Data
- 93 Dosimeter Type
- 94 Dosimeter Manufacturer
- 95 Sensitivity of Testing Procedures
- 96 Dosimeter Processing Procedures
- 97 Dosimeter Reading Procedures
- 98 Frequency of Reading Dosimeters
- 99 Frequency of Analysis
- 100 Type of Monitoring System
- 101 Type of Monitoring Test
- 102 Protection Equipment Requirements
- 103 Isotopic Information
- 104 Concentration Reading
- 105 Location of Reading
- 106 Duration of Exposure Reading
- 107 Requirements for Wearing Protection Equipment
- 108 Monitoring System for Other Substances
- 109 Sensitivity Procedures
- 110 Type of Monitoring Procedures Used
- 111 Toxic Substances--Concentration Readings
- 112 Location of Toxic Substance Readings
- 113 Test Frequency
- 114 Calibration Requirements
- 115 Chemical Inventories
- 116 Information on Product Particle Sizes and Chemical Form at Potential Release Points
- 117 Details of Chemical or Other Processes in a Facility, Past as well as Current, Including Engineering Drawings of Facility
- 118 Off-Site Monitoring or Sampling Locations and Results
- 119 Any Measurements of Release Points from the Facility (e.g., stack sampler results, water losses, sump measurements)
- 120 Inventory Records of Incoming and Outgoing Material
- 121 Reports of Losses of Material from a Stack
- 122 Report of Unplanned Releases, Incidents, Spills
- 123 Maintenance Records of Pollution Control Devices, such as Dust Collectors, Scrubbers, or Filters

APPENDIX A
INFORMATION REQUIRED BY THE DEPARTMENT OF ENERGY FOR
EPIDEMIOLOGIC AND HEALTH STUDIES (REVISED)

DATA PERTAINING TO CONTRACTOR ORGANIZATIONS

Any type of materials that will help understand the functional organization of the contractor, or to identify individuals who may have had responsibility for operations within a facility. These types of materials are useful when studying a facility because they enable the researcher to identify key personnel who were involved with certain projects and to contact these persons, when necessary, to help understand the nature of the plant operations and potential exposures that occurred in specific areas of the plant. Examples of records that may meet these needs are:

1. DOE/Contractor Organizational Charts
2. Contractor Organizational Histories/Plant Information Packets
3. Mission Statements of the Site and Individual Functional Units
4. Contractor Personnel Directories/ Telephone Directories
5. Position Descriptions and Associated Dates
6. Correspondence Files of Directors and Managers

DATA PERTAINING TO INDIVIDUALS

Identification of Individual

Epidemiologic studies of workers require the creation of lists of individuals at each facility who will be included in the study. Therefore, all records containing identifying information for employees at a specific facility are of great value. These records will typically be from personnel or payroll departments and may include the following data:

7. Social Security Number
8. Name
9. Maiden Name
10. Other Names
11. Address/Phone Number
12. Spouse Name
13. Spouse Address
16. Employer Identification Numbers (payroll, annuity, badge, etc.)

Demographic Information

In order to compare the characteristics of the worker population with other groups, it is desirable to know the following information:

17. Birth Date
18. Place of Birth
20. Sex

21. Race
22. Education (highest degree)
23. Marital Status

Work History

Work records indicating the type of jobs performed over specific periods of time are extremely useful. Specific data items are as follows:

24. Hire Date at Facility
25. Termination Date at Facility
26. Reason for Termination
27. Type of Employee (hourly, salaried, etc.)
28. Occupation or Job Title (all job titles held and associated dates)
30. Previous Work History
31. Work Location (building, area)
33. Reassignments and Work Restrictions
34. Job or Task Descriptions and Performance Appraisals

Medical Data

Medical records, records of treatment, incident or accident report, and company health insurance records may be useful for epidemiologic studies. Examples of the information that may be used from these records include:

35. Employee Physical Examinations
36. Smoking History
37. Alcohol/Beverage History
44. Drug/Medication Use History
38. Record of Injuries or Accidents Before or During Employment
39. Record of Exposure to Toxic or Carcinogenic Substances
40. Record of SICK and other Health-Related Leaves
41. Return to Work Clearances
42. Pathological Reports and Lab Results
45. Diagnostic X-Rays (dental, chest, other)
43. Family Disease and Mortality History
47. Employee Disease History, Including Predisposing Conditions
48. Record of use of Chelation Agents, including DTPA
51. Workers' Compensation Claims

Mortality Data (any type of information concerning death)

Many studies compare death rates in worker populations with rates in other populations. The following data items are useful:

53. Death Certificate
54. Date of Death
55. Cause of Death
56. Place of Death
57. Payment of a Death Benefit and Date
58. Vital Status at Last Known Date

DATA PERTAINING TO INDIVIDUAL EXPOSURE ASSESSMENT

External Radiation

External radiation exposure records that pertain to individual workers or to individual areas in a plant must be retained. Types of data items contained on these records are:

- 59. Estimated Whole Body Dose Due to X-Rays & Gamma Rays and Associated Dates
- 60. Estimated Whole Body Dose Due to Neutrons and Associated Dates
- 61. Estimated Whole Body Dose Due to Tritium and Associated Dates
- 62. Estimated Total Whole Body Dose and Associated Dates
- 63. Individual Dosimeter Types
- 65. Partial Body or Skin Doses and Associated Dates

Internal Radiation

Internal radiation exposure records for workers must be retained. Types of data items contained on these records are:

- 68. Bioassay Testing (including fecal and urine analysis) for nuclides
- 69. Estimated internal doses, including nuclides, organ of deposition
- 71. Whole Body Counts, including nuclides, type of instrument, results, units, and associated dates

INDUSTRIAL HYGIENE

Chemical Exposures

Data generated to evaluate occupational exposure levels and to demonstrate compliance with exposure limits should be systematically retained. The types of records of data that should be retained may include:

- 75. Results of Bioassays (including blood and urine analysis) such as exposure to chemicals, chemical names, results units, and associated dates
- 77. Monitoring Data Relating to Specific Work Locations or Assignments, including monitoring instruments, control data, results, units, and associated dates

Physical Agents

Data generated to evaluate occupational exposure levels and to demonstrate compliance with exposure limits should be systematically retained. Such data should include:

- 83. Inventories of Potentially Health Hazardous Physical Agents (noise, laser beam, electromagnetic fields, etc.), including associated dates, building, and locations
- 85. Survey of Work Areas, including associated dates, kind of monitoring equipment, results, and units

DATA PERTAINING TO FACILITIES

Area/Site Monitoring Information (by job category, year, building, etc.)

Other records that relate to the calibration, sensitivity, type, location of the equipment used for personnel monitoring, surveying, air sampling, etc., are quite useful, especially if they can be linked to specific processes, areas, buildings, and personnel. Information describing the general requirements followed by the facility for the provision of various personnel monitoring equipment, examinations, or testing is also desirable. Examples of these types of records include the following:

Physical Plant and Operations Records

- 88. Chemical or Other Processes, including building locations and associated dates
- 89. Hiring, Materials Handling & Other Practices
- 90. Requirements for Employment in Specific Jobs
- 114. Calibration Requirements
- 115. Chemical Inventories
- 117. Blueprints, Floor Plans, and Engineering Drawings of Building
- 120. Inventory Records of Incoming and Outgoing Material
- 123. Maintenance Records of Pollution Control Devices such as Dust Collectors, Scrubbers, or Filters

Worker Radiation Monitoring/Protection Programs

- 81. Monitoring Program Characteristics
- 91. Requirements for Wearing Dosimeters
- 93. Dosimeters Type
- 94. Dosimeter Manufacture
- 96. Dosimeter Processing Procedures
- 97. Dosimeter Reading Procedures
- 98. Frequency of Reading Dosimeters
- 102. Requirements for Use of Protection Equipment
- 107. Requirements for Wearing Protection Equipment

Environmental Monitoring

- 103. Results of Environmental Monitoring, including radionuclide or chemical information, units, and location
- 116. Information on Product Particle Size and Chemical Form at Potential Release Points
- 124. On-Site Monitoring or Sampling Locations and Results
- 118. Off-Site Monitoring or Sampling Locations and Results
- 119. Any Measurements of Effluents from Facility Relief Point, including stack sampler results, water losses, and sump measurements
- 121. Reports of Losses of Material from stack or filters
- 122. Reports of Unplanned Releases, Incidents, Spills

INDEX TO RECORD SERIES

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Health Physics Hygiene Progress Reports, 1949-1953	34
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(21) 18 ST

MISSING Hg FILES

Source: 6-83 computer printout
of Hg Files

(* = potentially relevant)

M	no. of items	description	date	custodian
*	54	(19 items) 81-10, storage flaking Hg recovery from extract	1970-75	D. Smith
? not locatable any more	75	(2 items) bottling log books	1977	D. Smith
?	469	(2) A-S plans; wire data	1960; 1978-83	J. Kendrick
duplicate?	481	(2) inventory item #2 says see M384	1969	J.M. Case
duplicate?	110	(1) Van Winkle study	9-7-82	CF
*	117	(1) HP Progress Report, Y-1066	7/12-1952	CF
*	111	(1) HP Progress Report, Y-1074	7/12-1953	CF
open lit.	125	(1) TLV values for Hg	1980	CF
open lit.	126	(1) Std. occup. exposure to Hg	1973	CF
open lit.	127	(1) Chronic Hg poisoning	1956	CF
open lit.	129	(1) biomethylation of toxic elements	1977	CF
open lit.	130	(1) AIHA: Hg exposure in chlorine industry	1970	CF
duplicate?	131	(1) Hg in suspended solids + bottom sediments	1976	CF
open lit.	132	(1) synthesis of methyl-Hg compounds	1968	CF
open lit.	134	(1) biological cycles for toxic elements	1974	CF
open lit.	135	(1) Hg hazard in industry	1968	CF
open lit.	138	(1) ^{vapor} Hg inside buildings	1972	
open lit.	137	(1) MACs for Hg compounds	1969	CF
ORNL NSF	146	(1) Hg in the environment, ORNL/NSF-EP-1	1971	CF
open lit.	141	(6 items) Hg Health + Safety articles	1966-82	McCauley
DOE order	142	(1) DOE environmental program	1981	McCauley
*	143	(7 items) 2 duplicates, 2 open lit. (2 EFPc aquatic surveys, (NTP Pond Y-DD-128)	1972, 73	J. Arendt
?	159	(2) Colic development	1958	CF
open lit.	159	(1) Hg + theft article	1965	CF
open lit.	165	(1) Cassarett and Doull's Toxicology	1980	J. Arendt
open lit?	166	(1) Hg exposure stds by L. Thomas Geological Survey	1973	J. Arendt
open lit?	167	(1)	1978	J. Arendt

M	items	description	date	custodian
duplicate	770 (2)	duplicate of M731, H ₂ O quality stds. 1976,79	1976,79	J.Arendt
duplicate	770 (1)	duplicate of M740	1971	J.Arendt
open lit.	772 (8 items) 677 npt. Elwood, H ₂ O quality, OR spill plan, (methyl-Hg(3)) 1964-82	M771 Hg geochemistry EPA/600/7-78-146, ORNL-TM-7446, 1970; Hg in environment chem, 1970	1980	J.Arendt
?	773 (2)	Alpha-4 decor, Hg in sediments (open lit.)	1983	"
?	774 (3)	Hg in Almaden, Spain; (Hg in environment) chem	1970	"
?	775 (5)	3 analytical air, 2 test books	1971-81	"
duplicate?	777 (1)	Alpha-5 flooding experiment Y-B65-69	1955	CF
?	778 (1)	Solvent pump specs	Y-B65-73	1955 CF
duplicate	785 (1)	1977 Case report - note says see M369	1977	D.Smith
?	800 (1)	Hg inventory	1962	"
?	801 (1)	correspondence - flasking	1973-75	"
?	802 (1)	correspondence - inventory	1957	"
*	803 (1)	correspondence - history	1957-74	"
?	804 (1)	alloy air contamination (open shop)	1954	CF
open lit.	805 (1)	methyl Hg and Selenium	1982	W.Cox
open lit.	811 (1)	Hg effects	1982	"
*	815 (1)	Study of the recovery of Hg losses by H.Kite	1958	C.Doty
open lit.	816 (1)	methyl Hg	1972	W.Cox
open lit.	817 (5)	also M-292, EPA/560/3-75-007, TESTAPS, 2 minima, Hg in the Envir., Case, ORNL	1971	Arendt, CF
?	818 (1)	Hg inventory	1976-77	-
open lit.	821 (1)	Y/B6-18 1982 Env. Monitoring Report	1983	CF
?	822 (1)	Zeb Bell study correspondence	1973-74	C.West
*	832 (1)	Hg in stack air	1953	C.West
?	58 (1)	Hg correspondence	1975-83	D.Smith
?	306 (1)	Hg flask data	1965	Traffic
?	381 (1)	Hg shipments	1982	Bayer, Stroes

M	Item	Description	Date	Custodian
---	------	-------------	------	-----------

390 (1) Alpha-2 Hg incident 1971 T. Wilson

(1) - duplicate of 19524
Waste disposal at Y-12 Y-1392-20 1957 CF
Hg Content in Boxes + Clinch ORNL CF 17/320 1977

2348 ST

Source: 6-83 computer printout
of Hg FilesExplanations Reg'd (55)

(* = would like to see)

M	no. of items	description	date	custodian
*	54	(9 items) 81-10, storage flasking Hg Recovery from extract	1970-75	D. Smith
? may be redundant of M384	195	(2 items) bottling log books	1977	D. Smith
? duplicate?	469	(2) A-5 plans; wine data	1960; 1978-83	J. Kendrick
? duplicate?	481	(2) inventory Item #2 says see M384	1969	J. M. Case
open lit.	490	(1) Van Winkle study	9-7-82	CF
*	497	(1) HP Progress Report, Y-1066	7/6/2-1952	CF
*	499	(1) HP Progress Report, Y-1074	7/6/2-1953	CF
open lit.	725	(1) TLV values for Hg	1980	CF
open lit.	726	(1) Std. occup. exposure to inorg. Hg	1973	CF
open lit.	727	(1) Chronic Hg Poisoning	1956	CF
open lit.	729	(1) biometabolism of toxic elements	1977	CF
open lit.	730	(1) AIHA: Hg exposure in chlorine industry	1970	CF
open lit.	731	(1) Hg in suspended solids + bottom sediments	1976	CF
open lit.	732	(1) synthesis of methyl-Hg compounds	1968	CF
open lit.	734	(1) biological cycles for toxic elements	1974	CF
open lit.	735	(1) Hg hazard in industry	1968	CF
open lit.	738	(1) Hg inside buildings	1972	
open lit.	739	(1) MAC's for Hg compounds	1969	CF
? ORNL NSF-EP-1	740	(1) Hg in the environment, ORNL/NSF-EP-1	1971	CF
open lit	741	(6 items) Hg Health + Safety articles	1966-82	McCauley
DOE order	742	(1) DOE environmental program	1981 1972, 73	McCauley
*	743	(7 items) 2 duplicates, 2 open lit. 2 EPC aquatic surveys, (NH Pond Y-DD-128)	1958	J. Arendt
?	757	(2) Color development		CF
- open lit.	759	(1) Hg theft article	1965	CF
open lit.	765	(1) Cassarett and Doull's Toxicology	1980	J. Arendt
open lit?	766	(1) Hg exposure stds by L. Thomas	1973	J. Arendt
open lit.	767	(1) Geological Survey	1978	J. Arendt

M	Items	Description	Date	Custodian
duplicate	770 (2)	duplicate of M731, H ₂ O quality stds.	1976, 79	J.Arendt
duplicate	770 (1)	duplicate of M740	1971	J.Arendt
open lit.	772 (8 items)	6-77 not. M771 Hg geochemistry EPA/600/7-78-146, Elwood, H ₂ O quality, OR spill plan, (methyl-Hg(3)) 1964-82	1983	J.Arendt
?	773 (2)	Alpha-4 decom, Hg in sediments (open lit.)	1983	"
?	774 (3)	Hg in Almaden, Spain; (Hg in environment) ORNL-TM-7446 1970 Hg geochem. 1980	1970	"
?	775 (5)	3 analytical Hg, air 2 test books	1971-81	"
duplicate?	777 (1)	Alpha-5 floating experiment Y-B65-69	1955	CF
?	778 (1)	Silver pump specs Y-B65-73	1955	CF
duplicate	785 (1)	1977 Case report - note says see M369	1977	D.Smith
?	800 (1)	Hg inventory	1962	"
?	801 (1)	correspondence - flasking	1973-75	"
?	802 (1)	correspondence - inventory	1957	"
*	803 (1)	correspondence - history	1957-74	"
?	804 (1)	alloy air contamination (open shop)	1954	CF
open lit.	805 (1)	methyl Hg and selenium	1982	Wilcox
open lit.	811 (1)	Hg effects	1982	"
*	815 (1)	Study of the recovery of Hg losses by H. Kite	1958	C.Doty
open lit.	816 (1)	methyl Hg 2/50 M-79A2	1972	Wilcox
open lit.	817 (5)	EPA/560/3-75-007, NESHAPS, 2 minutes, CRC Hg in the Env. 1971 Case, ORNL	1971-79	Arendt, CF
?	818 (1)	Hg inventory	1976-77	-
open lit.	821 (1)	Y/UB-18 1982 Env. Monitoring Report	1983	CF
?	822 (1)	Zeb Bell study correspondence	1973-74	C.West
*	832 (1)	Hg in stack air	1953	C.West
-	?	58 (1)	Hg correspondence	1975-83 D.Smith
?	306 (1)	Hg flask date	1965	Traffic
?	381 (1)	Hg shipments	1982	Bay, Stores

M	Item	Description	Date	Custodian
*	390 (1)	Alpha-2 Hg incident	1971	T. Wilson
duplicate	(524) (1)	duplicate of 14524 Waste disposal at Y-12 Hg Content in. Padre & Clinch ORNL CF 17/320 1977	Y-12 20 1957	CF

OAK RIDGE Y-12 PLANT INFORMATION CONTROL FORM

DOCUMENT DESCRIPTION (Completed By Requesting Division)

Document No.	Author's Telephone No.	Acct. No.	Date of Request
<u>Y/TS-1284/19/DEL REV</u>	<u>6-0263</u>	<u>2366000 3</u>	<u>9/8/95</u>

Unclassified Title: HANWRITTEN NOTES TAKEN BY CHEMRISK
DURING WEEK OF SEPTEMBER 4, 1995

Author(s) S. M. FLACK

TYPE: Formal Report Informal Report Progress/Status Report Co-Op Report Thesis/Term Paper

Oral Presentation (Identify meeting, sponsor, location, date): _____

Journal Article (Identify Journal): _____

Other (Specify): To Be Released to ChemRisk, Phase II

Document will be published in proceedings No Yes

Document will be distributed at meeting No Yes

Document has patent or invention significance No Yes (Identify) _____

Document has been previously released No Yes (Reference) _____

DIVISION REVIEW AND APPROVAL (Completed By Requesting Division)

TECHNICAL CLASSIFICATION REVIEW (Divisional Classification Representative)

Title(s): <u>U</u>	Abstract: <u>-</u>	DOCUMENT REQUEST APPROVED (Division or Department)
DOCUMENT: Level <u>SECRET</u> <u>Ranger SV</u>	Category <u>RD</u> <u>9/18/95</u>	<u>M.D. O'Key</u> Signature <u>9/15/95</u> Date
Signature _____		Signature _____ Date _____

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<u>G.J. Frasher</u>	<u>9/18/95</u>
Y-12 Classification Office	Date

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Date

Number

~~9/1/82~~

M-753

~~8/1/87~~~~77K09028~~ ~~21-6-4~~

Smith (his copy)

~~8/8-82~~~~Ever Sanders~~~~8/6-18-83~~

Colby Losen (n)

TAKEN BY

DATE

NUMBER, SUBDIVISION OR NAME

~~Smith (Wilma)~~ 6/23/65 S 135 | ~~J. Goldstein~~

R L White 9-20-65 54X-85529

~~C. T. McCallum~~

~~E. K. Reddish~~

Byrdell Styler 11/18/65 59X-72499

~~Perry~~

~~8-3-66~~ R L Coffey

~~5-18-67~~

~~C. D. Coffey~~

~~6-18-63~~ m. 786

Smith

Bldg 9201-4 Procon notebook
(Smith's copy?) re

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To Be Filed Pile

1. M-499 (Y-1074) copied extract pages (# need Y/HG-551 extract pages)
2. Y/HG-33 / M-601 (7-54) SF material = ?
3. M-482 A7-3(6) 11-8-8 Box SW sampling 1-58 thru 12-58 (already have?)

1.	-297	M-487	personnel in solvent cleanup program	2-56
5.	Y/HG-534	M-602	Hg procurement requirements inventory	1953
6.	-539	M-4445		56
7.	-541	M-4445		56
8.	-393	M-762	corrosion tests on bid bath evaporators	55
9.	M-451	Hg in the Envir.	Sci. Amer. 571	Open lit.
10.	M-727	Hg poisoning	Univ. Rach. 1956	
11.	M-458	Hg in industry	Chem. Ind. 2-68	
12.	M-458	ORNL monitoring reports & correspondence	1972	

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Misc Drawer - back (no M's)

- ✓ 1. "SW Sampling" 1961 thru 1963 (discontinuous) requested copies 14-unknown missing 10-61, 12-61, 3-62, ~~8-62~~, 9-62, 11-62, 12-62, 1-63, ~~2-63~~ 8/26 missing
2. Y/HG-158 1983 M-unknown
3. ... 2 empty folders M-419, M-854
4. Sanders 1970 data Y/HG-0091 dupl. ~~M-54?~~ *chk. printout M-492

Misc. Drawer - front (red review?) some open lit removed so wouldn't copy (copyright) some envir. removed - don't know why? ^{notes}

M-54 Hickman corresp. GAO 1972-
- early 50's shipments (duplic.)
- 1972 ORNL Hg questionnaire
- prices, bids (Mellony sale) on sludge
(81-10 stuff copied)

M-393 P7-4(4) dups in other files
corresp. 1963-83 v. discontinuous
Case, Hickman
inventory, GSA

M-490 Van Winkle 1982 = ORNL/CF-82/251
" 1984 = TM-8894

M-726 Occup Exposure NIOSH (open lit.)

M-757 A5-9(d) "Active Program + Major war Distribution"
mostly manganese - no date 1958?

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M-760 Hg correspondence Q1-4 1956-81

Hg cleanup 1983

Hg inventory 1965 > 1974

A-5 A-4
parts analysis 1980 sale

Little report, News memo and other dups

GSA flossing 70's

have
other
folders
of this
no.
~~M-492~~
~~M-584~~

} empty folders

M-721 Y/UB-18 CY 82

M-725 TLV doctn > 1977

M-729 bio CH₃Hg 1977 Science 197(4301): 329-332

M-730 Hg in cl manf. AIHA 1970

M-732 CH₃Hg synthesis H state 1968 220: 173-174

M-734 biol. cycles for toxic elements Science 1974

M-738 Hg vapor in bldgs. 1972 Science

M-739 MAC Hg 1969

✓ M-740 Hg in Envir. 1971 ORNL NSF-EP-1
? M-792-817 EPA 560/3-75-007 cover sheet only
? M-793 Univ Rich Hg Poisoning 1956

check out cards (not specific document title)

223 medical

M-741 McCauley

742 "

43 Arendt

44 " see M-223"

45 Arendt

48 Arendt

49 empty folder

52 McCauley

765 Arendt

66 "

67 "

70 Karen Bradley

72 Arendt

73 Arendt

74 "

75 "

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p.4 of 4

- ✓ M-759 Hg means larceny (1965)
780 "See M-40" correspondence (Sheets only) (above)
796 SAR letter (1976)?
804 Li safety
805 Se + Cd/Hg Exp. Pathology 1983 23(3): 143 - 156
806 "note says not relevant to Hg problems"
808 empty folder
811 Hg effects on cells 1982
813 empty folder
✓ 815 Prelim Study of Recovery of Li + Hg Hg Pollution
816 CH₃Hg tox 1983 Environ. Res. 1971 22-34
817 CRC, bk. w. Minamata, EPA-S60... sheets / 6PA NESHAPS, C&EN 49(22):
822 Zeb Bell corresp. (sheet only) folder title
825 Y/HG-0028 (has "1955 Poplar Creek flows")
 "1955" 2 few days in Aug. only
829 A-S SAⁱⁿ data 1958 (sheet only)
842 Auerbach's testimony (Draft printout)
844 mid'd ref. list >1983 many Hucksbees
846 Y/HG-131 dupe
✓ 847 PCB's
850 empty folder

M-347 floating station drawings (1976-77)
334 A-S equipment bids (1965)

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M-753 copy checkouts card

-788 "

-797 Detailed Description of Elex Equipment, Conditions & Operation
YFC-1635-33 (1954)

" Y/HG-435

-798 -133

-799 Hg Classification Guidance

-807 A-4, A-5 Air Analysis - stack samples 4-56 to 2-57
YFC-1456

only one page / sample no. | date | location | time of sample | cfm | ft³ | ug Hg | ug Af³

all other pages 2-19-57 20 A-4 H₂ vent 50-480 → lug alloy |
21

-808 all Li / same as above (12-54 to 5-57)

-809 " (12-55 to 11-56)

-823 all wire

-824 all wire

-825 Y/HG-0017 5-55 to 12-55 flow data EFPC - originals

-826 0079 12-55 to 8-56 "

-827 80 DEL β-4 July HP reports 1954

-829 Y/HG- 162

-830 163

-831 164

-834 049,81

-835 67,82

-836 169-175,191

-837 " Source Samples in A-5" Dec 55 0.7 - 2.5 + mg/m³

-838 Y/HG-526 AS vent'fn data AND drawings uB of meter?

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M-839 A-5 exhaust study - readings + drawings
M-840 Y/HG-437 "Pop. Ck. autom's"

✓ Young
✓ Steve

Susan,

This is what I have found.

M75, M778, M524 were available but needs to be modified

M58, M306, M381, M390 folders were available but documents were not found

337
758
759
782

Others were simply missing.

Corrections for 75, 778, and 524 are as follows:

~~75~~ (1) Mercury Recovery from Extract 10/18/70

~~778~~ (1) solvex pump specs

~~524~~ (1) Mercury Contamination In Poplar Creek and Clinch River Elwood 843 misc
ORNL CF-77/320 1977 848 misc
760 mpt

I hope this is what you requested and wanted.
Have a good weekend.

Young

HGFILE.XLS

X	674	Alloy Division Monthly Progress Report (9-80)
X	675	Alloy Division Monthly Progress Report (10-80)
X	676	Alloy Division Monthly Progress Report (11-80)
X	677	Alloy Division Monthly Progress Report (12-80)
X	678	Alloy Division Monthly Progress Report (1-81)
X	679	Alloy Division Monthly Progress Report (2-81)
X	680	Alloy Division Monthly Progress Report (3-81)
X	681	Alloy Division Monthly Progress Report (4-81)
X	682	Alloy Division Monthly Progress Report (5-81)
X	683	Alloy Division Monthly Progress Report (6-81)
X	684	Alloy Division Monthly Progress Report (7-81)
X	685	Alloy Division Monthly Progress Report (8-81)
X	686	Alloy Division Monthly Progress Report (9-81)
X	687	Alloy Division Monthly Progress Report (10-81)
X	688	Alloy Division Monthly Progress Report (11-81)
X	689	Alloy Division Monthly Progress Report (12-81)
X	690	Y-12 Plant Quarterly Report (3Q73)- see M197 for 4Q73
X	691	Y-12 Plant Quarterly Report (1Q74)
X	692	Y-12 Plant Quarterly Report (2Q74)
X	693	Y-12 Plant Quarterly Report (3Q74)
X	694	Y-12 Plant Quarterly Report (4Q74)
X	695	Y-12 Plant Quarterly Report (1Q75)
X	696	Y-12 Plant Quarterly Report (2Q75)
X	697	Y-12 Plant Quarterly Report (3Q75)
X	698	Y-12 Plant Quarterly Report (4Q75); YIEX-21 The 1983 Mercury Task Force Report (8-83)
X	699	Y-12 Plant Quarterly Report (1Q76)
X	700	Y-12 Plant Quarterly Report (2Q76)
X	701	Y-12 Plant Quarterly Report (3Q76)
X	702	Y-12 Plant Quarterly Report (4Q76)
X	703	Y-12 Plant Quarterly Report (1Q77)- see M232 for 2Q77
X	704	Y-12 Plant Quarterly Report (2Q77)
X	705	Y-12 Plant Quarterly Report (3Q77)
X	706	Y-12 Plant Quarterly Report (1Q78)
X	707	Y-12 Plant Quarterly Report (2Q78)
X	708	Y-12 Plant Quarterly Report (3Q78)
X	709	Y-12 Plant Quarterly Report (4Q78)
X	710	Y-12 Plant Quarterly Report (1Q79)
X	711	Y-12 Plant Quarterly Report (2Q79)
X	712	Y-12 Plant Quarterly Report (3Q79)
X	713	Y-12 Plant Quarterly Report (4Q79)
X	714	Y-12 Plant Quarterly Report (1Q80)
X	715	Y-12 Plant Quarterly Report (2Q80)
X	716	Y-12 Plant Quarterly Report (3Q80)
X	717	Y-12 Plant Quarterly Report (4Q80)
X	718	Y-12 Plant Quarterly Report (1Q81)

Y/HG docs

394 Jan 95

440 Aug 95

Y-12 PLANT

HEALTH STUDIES AGREEMENT

Compliance, Planning, & Resources Department

Lockheed Martin Energy Systems, Inc.

P.O. Box 2009, 9106, MS 8023

Dak Ridge, TN 38731-8023

(615) 576-0263

Internet Address: SW8@ORNL.GOV

Fax #: (615) 576-4595

To: S. M. Flack Date: August 17, 1995
Fax #: (303) 939-8318 Pages: 1, including this cover sheet.
From: Steve W. Wiley
Subject: List of documents found in 9711-5

Susan....

Here is a list of documents that I found that have not yet been refiled:

- M-445 Y/HG-0539
- M-445 Y/HG-0541
- M-441 M-451?
- M-458 (10 documents)
- M-482 (Surface Water Sampling)
- M-487 Y/HG-0297/DEL REV)
- M-499 Y-1074
- M-601 Y/HG-0331
- M-602 Y/HG-0534
- M-727 UR-468
- M-735
- M-762 Y/HG-0393

Found 2 out of 7 that I need to see
4 of 55 missing

*

* M-497 Y/HG-0054 (last document filed in Reading Room on 8/14/95)
Y-to66

Steve Wiley
HAS Coordinator
Y-12 Plant

Oak Ridge Dose Reconstruction Systematic Document Search
Weekly Progress Report

Analyst: Flack	Week of: 12-12-94 24 h 2-15-95 16 h
Location(s) Searched: Y/HG-Files	
<i>Bldg. 710(0) Y-12</i> Weekly Totals Number of Boxes Searched: <u>440</u> Number of Document Summary Forms Completed: <u>0</u> Time Spent Reviewing Documents (hours) Systematic: <u>0</u> Directed: <u>40</u> [for Task(s): <u>2</u>] Total: <u>40</u>	
Summary of Top Three Findings [describe and identify relevant Task(s)]: <i>monthly handwritten</i> 1. Y/HG-0005,-0023 = 1957-1962 Bldg. 81-10 <i>logsheet</i> s of lbs. of mercury recovered by distillation in the furnace and by decanting Y/HG-0499 = mercury recovery furnace efficiency study (1959) 2. Y/HG-0055 = 1955-1956 East Fork Poplar Creek mercury concentrations <i>on ≥ monthly and weekly basis</i> Y/HG-0437 = 1954-1956 EFPC mercury concentrations on <i>≥ quarterly basis that are not in the mercury report Y/EX-21/OEL REV</i> 3. Y/HG-0077,-0079 = 1955-1956 EFPC creek flow data <i>on ≥ daily basis</i> <i>(Please describe additional important findings on the back of this form.)</i>	
Summary of Problem Areas: <ol style="list-style-type: none"> 1. not organized by subject ; don't know how it fits together 2. all unclassified, unaltered documents from Mercury Files 	
Next date scheduled for systematic search: <u>6-12-95</u>	

OVER →

4. $\gamma/\text{HG-1116}, -0281 =$
 $\begin{matrix} (1977) \\ (1956) \end{matrix}$

the 2 attachments to the 1977 Mercury Inventory Report
(Y/AD-428) which detail EPPC^{annual} mercury concentrations
and the building ventilation study conducted in Alpha-5

5. $\gamma/\text{HG-284} =$
 $\begin{matrix} (1955) \end{matrix}$

details of changes to be made to Alpha-5 and Alpha-4
buildings in air changes/hour

470
440 Total Mercury Documents
August 14 , 1995

EXTRACTED PAGES FROM REPORT SERIES REQUESTED BY CHEMRISK

- Y/EXT-00005 Selected Pages From Y-12 Plant Quarterly Report M-24 for October 1-December 31, 1952
- Y/EXT-00030 Selected Pages From Y-12 Plant Quarterly Report M-25 for January 1-March 31, 1953
- Y/EXT-00003 Selected Pages From Y-12 Plant Quarterly Report M-26 for April 1-June 30, 1953
- Y/EXT-00004 Selected Pages From Y-12 Plant Quarterly Report M-27 for July 1-September 30, 1953
- Y/EXT-00006 Selected Pages From Y-12 Plant Quarterly Report M-28 for October 1-December 31, 1953
- Y/EXT-00027 Selected Pages From Y-12 Plant Quarterly Report M-29 for January 1-March 31, 1954
- Y/EXT-00014 Selected Pages From Y-12 Plant Quarterly Report M-30 for April 1-June 30, 1954
- Y/EXT-00007 Selected Pages From Y-12 Plant Quarterly Report M-31 for July 1-September 30, 1954
- Y/EXT-00008 Selected Pages From Y-12 Plant Quarterly Report M-32 for October 1-December 31, 1954
- Y/EXT-00009 Selected Pages From Y-12 Plant Quarterly Report M-33 for January 1-March 31, 1955
- Y/EXT-00010 Selected Pages From Y-12 Plant Quarterly Report M-34 for April 1-June 30, 1955
- Y/EXT-00011 Selected Pages From Y-12 Plant Quarterly Report M-35 for July 1-September 30, 1955
- Y/EXT-00012 Selected Pages From Y-12 Plant Quarterly Report M-36 for October 1-December 31, 1955
- Y/EXT-00034 1Q56 M-37
- Y/EXT-00035 2Q56 M-38

Y/EXT-00013	Selected Pages From Y-12 Plant Quarterly Report M-19 for July 1-September 30, 1956	
Y/EXT-00036	4Q56	M-39
Y/EXT-00037	1Q57	M-86
Y/EXT-00038	2Q57	M-87
Y/EXT-00039	3Q57	M-88
Y/EXT-00040	4Q57	M-89
Y/EXT-00041	1Q58	M-121
Y/EXT-00042	2Q58	M-122
Y/EXT-00043	3Q58	M-123
Y/EXT-00044	4Q58	M-124
Y/EXT-00045	1Q59	M-125
Y/EXT-00046	2Q59	M-126
Y/EXT-00047	3Q59	M-127
Y/EXT-00048	4Q59	M-128
Y/EXT-00049	1Q60	M-129
Y/EXT-00050	2Q60	M-130
Y/EXT-00051	3Q60	M-131
Y/EXT-00052	4Q60	M-132
Y/EXT-00053	1Q61	M-133
Y/EXT-00054	2Q61	M-134
Y/EXT-00055	3Q61	M-135
Y/EXT-00056	4Q61	M-136
Y/EXT-00057	1Q62	M-137
Y/EXT-00058	2Q62	M-138
Y/EXT-00059	3Q62	M-139
Y/EXT-00060	4Q62	M-140
Y/EXT-00061	1Q63	M-141

[Quarterly report extract series continued through 1962; series has quarterly average EFPC Hg concentrations and quarterly and monthly average building air Hg concentrations for buildings A5 from 7-55 until 9-60, A4 from 7-55 until 10-61, % above MAC for 81-10 from 7-57 until 10-61, quarterly and monthly averages for 9808 from 1-58 until 10-61. Note that A5 was restarted and A4 was shutdown in 10-62, and 81-10 was restarted in 1-62 and curtailed for the summer of 1962.]

Y/EXT-00023	Selected Pages From Technical Division Monthly Progress Report M-1 for January 1955 (Pages 70-75) M-1	
Y/EXT-00022	Selected Pages From Technical Division Monthly Progress Report for February 1955 (Pages 88-90) M-2	

- Y/EXT-00015 Selected Pages From Technical Division Monthly Progress Report for March 1955
(Pages 89-95) M-3
- Y/EXT-00021 Selected Pages From Technical Division Monthly Progress Report for April 1955
(Pages 29; 79-85) M-4
- Y/EXT-00016 Selected Pages From Technical Division Monthly Progress Report for May 1955
(Pages 28-29; 37-38; 73-79) M-5
- Y/EXT-00017 Selected Pages From Technical Division Monthly Progress Report for June 1955
(Pages 36-40; 51-52; 85-91) M-6
- Y/EXT-00018 Selected Pages From Technical Division Monthly Progress Report for July 1955
(Pages 37; 49; 85-91) M-7
- Y/EXT-00019 Selected Pages From Technical Division Monthly Progress Report for August 1955
(Pages 42-43; 54-55; 56; 93-100) M-8
- Y/EXT-00020 Selected Pages From Technical Division Monthly Progress Report for September 1955 (Pages 42; 45-46; 95-102) M-9
- Y/EXT-00024 Selected Pages From Technical Division Monthly Progress Report for October 1955 (Pages 57-58; 95-102) M-10
- Y/EXT-00025 Selected Pages From Technical Division Monthly Progress Report for November 1955 (Pages 22; 48-49; 55; 94-102) M-11
- Y/EXT-00026 Selected Pages From Technical Division Monthly Progress Report for December 1955 (Pages 18; 20; 52-53; 62; 64; 102-111) M-12
- Y/EXT-00028 Selected Pages From Technical Division Monthly Progress Report for January 1956 (Pages 24-26; 56-58; 69-71; 109-117) M-13
- Y/EXT-00075 2-56 M-94
- Y/EXT-00076 3-56 M-95
- Y/EXT-00077 4-56 M-96
- Y/EXT-00078 5-56 M-97
- Y/EXT-00079 6-56 M-98
- Y/EXT-00080 7-56 M-99
- Y/EXT-00081 8-56 M-100
- Y/EXT-00082 9-56 M-101
- Y/EXT-00083 10-56 M-102
- Y/EXT-00084 6-57 M-111
- Y/EXT-00085 7-58 M-148

Y/EXT-00086	8-58	M-149
Y/EXT-00087	9-58	M-150
Y/EXT-00088	10-58	M-151
Y/EXT-00089	11-58	M-152
Y/EXT-00090	12-58	M-153

[1955 Monthly Technical Progress Report series has monthly EFPC Hg concentrations for 1955; monthly series became quarterly in 1959 and EFPC concentrations were not reported]

Y/EXT-00031 Selected Pages From Y-12 Technical Progress Report for the first quarter, FY 1960
(July-September, 1959) (Pages D-5 - D-8) M-14

Y/EXT-00029 Selected Pages From Y-12 Technical Progress Report, Part D-Laboratory for May-July 1963 (pages D-48/D-54) M-15

[2 1949 Health Physics-Hygiene Progress Reports (Y/HG-136 and Y/HG-197) have monthly average building air Hg concentrations for miscellaneous 9000 buildings, e.g., 9733-3 and 9720-5]

PUBLICALLY RELEASED DOCUMENTS FROM THE LARGE-SCALE REVIEW

© = a copy of the document was requested

✓ = document has been reviewed

= the information control form for the document has been reviewed

italics = notes made in addition to information control form document descriptions

✓Y/HG-0001 *Excessing of Mercury for flasking and shipment from Alpha-4: Correspondence with attachments (1975-76) #6 discusses cracks in 9720-26*

✓Y/HG-0002 *Mercury Flasking in Alpha-4: Correspondence with attachments (1974-77)*

✓Y/HG-0003 *Solvent Capitalization and Write Off (1956-62) #1 is A4 usage; #2 is A4,A5 losses; #11 is A2 loss- see smf 1-12-95 notes*

✓Y/HG-0004 *Monthly Mercury Inventory Reports Mercury Storage Inventory & Adjustment Balance Sheets (1975-79)*

©✓Y/HG-0005 *Solvent Recovery Facility Log Sheets (4/57 to 5/62 incomplete) from M-65; these are typed versions of logsheets compared to Y/HG-0023; November 1957 and May through Dec. 1961 are missing,*

✓Y/HG-0006 *Building 9201-5 - Stripping Progress Report (3/65 to 1/66)*

©✓Y/HG-0007 *MCT (multi-column) Solvent recovered from MCT cooling towers (1955) / lost at A2 (1959); several accounting letters, such as -0007/6 (\$337K covers loss of solvent in A-2).*

✓Y/HG-0008 *Mercury Loading (storage) and Related Costs (1966-82)*

✓Y/HG-0009 *Information Related to Mercury storage and handling (1980-83)*

✓Y/HG-0010 *DOE Owned Mercury for Sale by GSA (2/80)*

✓Y/HG-0011 *DOE-Owned Mercury for Sale by GSA (3/80)*

✓Y/HG-0012 *Mercury Storage and Transfers (1963-73)*

©✓Y/HG-0013 *General Mercury Correspondence Including Letters, Memos, and Attachments for Alpha-4 (1973-83); 1975-76 A-4 flassing; 1983 clean up plan*

✓Y/HG-0014 *Safety analysis report - Mercury Flassing in Alpha-4 (1976); see M-347,-348,-409,-447*

✓Y/HG-0015 *AEC Mercury Shipment Orders (1965-68)*

©✓Y/HG-0016 Mercury Recovery from *LiOH Extract report from MIT, document no. KT-542* (10-18-60)

✓Y/HG-0017 Mercury Public Sale FY 1965- *shipping orders to companies*

✓Y/HG-0018 Mercury Shipments, 1964- *shipping orders to companies*

✓Y/HG-0019 Request for *Purity Analyses - 45,000 Flasks of Mercury (2/80)- < LODs except for silver*

✓Y/HG-0020 Mercury Costs (Amendment #13 to memorandum of Agreement #GS-000-23195/SCM) (4/81)

✓Y/HG-0021 Mercury Flasking Data 9211-4 *flasking station (5/76 to 1/78)*

Y/HG-0022 Proposed Mercury Storage Building 9720-26 (2/63)

©✓Y/HG-0023 Solvent Recovery *Log Sheets (1957-62) from M-68; 1/58 through 10/62, mostly handwritten logsheets compared to Y/HG-0005.*

©✓Y/HG-0024 Alpha-5 H₂ SO₄ Task Inspection Demineralized Water Line Drawing and Alpha-4 Auxiliary Inventory Sheet (5/62)

✓Y/HG-0025 Alpha-4 Mercury Inventory Procedure, Flask Shipping Correspondence (date?)

✓Y/HG-0026 Mercury Physical Properties (8-20-57) *includes specific gravity, solubility of alloy in solvent*

✓Y/HG-0027 Alpha-4 Mercury Bottling Logbook (1969)

✓Y/HG-0028 Alpha-4 Solvent Bottling Logbook (1968-69)

✓Y/HG-0029 Mercury Bottling Log Books (2nd quarter 1965, 2nd quarter 1971)

Y/HG-0030 A Study of Mercury as Charge to Determine Factors Affecting Output (6/47)

Y/HG-0031 Electromagnetic Concentration of the Stable Isotopes of Mercury (8/51)

Y/HG-0032 Refrigeration System Used in mercury Isotope Collections (12/49)

✓Y/HG-0033 Water Treatment Correspondence (1966-1968) *water supply*

✓Y/HG-0034 Mercury *urine* bioassay data, Beryllium worker surveillance, radiation exposure monitoring correspondence (date?)

- ✓Y/HG-0035 Construction Project Data Sheet, Air and Water Pollution Control (6/67) *no mention of mercury*
- ✓Y/HG-0036 Mercury transfers, purity correspondence, 1962
- ✓Y/HG-0037 Excessing of Mercury for Disposal by GSA (5/79)
- ©✓Y/HG-0038 New Hope Pond Dredging Operation (10/72) *by M. Sanders- see smf 1-12-95 notes*
- ✓Y/HG-0039 Warehousing and Storage Survey, Y-12 Plant, Mercury Shipment receipts, requirements (1954)
- ✓Y/HG-0040 Lab Comparisons for ERA Water Batch Mercury (1978-82)
- ✓Y/HG-0041 Additional Data on Core Samples from New Hope Pond (8-18-82)
- ✓Y/HG-0042 ORNL Report No. CF-82/257 "Mercury Contamination East Fork Poplar Creek and Bear Creek" (9-7-82) *by Van Winkle*
- ✓Y/HG-0043 Statistical Analysis of Fish, *Sediment, Vegetation* Data by ? (date? but after Elwood's 1977 report)- *mercury concentration proportional to size of fish*
- Y/HG-0044 Mercury Analyses of Air Samples - Buildings 9201-4, Letter: Johnson to Bean (2-9-83)
- Y/HG-0045 Mercury Analysis - Poplar Creek (5/82 to 1/83)
- ✓Y/HG-0046 Mercury Contamination Study - Meeting Notes (*see smf 1-12-95 notes*)/Task Plans/*Data* (1982)
- Y/HG-0047 Notes on Mercury Sampling Medium and Locations *for foliage and plants, Bear Creek and EFPC 1.3 and 5 RM* (5/82)
- ✓Y/HG-0048 Mercury Contamination in New Hope Pond, East Fork Poplar Creek and Bear Creek *by Van Winkle* (6-2-82 briefing) *good map on p. 24*
- ©✓Y/HG-0049 Monthly Solvent (*Air Samples*) Report Building 9204-4 (9/54 to 1/55) *from M-834*
- Y/HG-0050 EMCR QA Technical Meeting No 31; and Air Samples, Building 9201-4 (3/83)
- ✓Y/HG-0051 Health and Safety precautions to Alpha-5 stripping; letters meeting ,minutes, bid & acceptance-scrap sales, 1965 (*pre-stripping*)
- Y/HG-0052 NPDES Compliance Monitoring of Oak Ridge Facilities by Tennessee Division Water

Quality Control Personnel (7/76)

✓Y/HG-0053 Notebook Numbers for Alpha-4 Losses (5/58 to 3/61)

Y/HG-0054 Health Physics Progress Report, July 1952 through December 1952

©✓Y/HG-0055 Results of Poplar Creek Water Analyses (12/54 to 12/55) by M. Sanders from M-488; 8 months of monthly avgs and 4 months of weekly avgs

Y/HG-0056 Industrial Hygiene Mercury Sampling Correspondence and Data for Alpha-4 (1978-83)

©✓Y/HG-0057 Industrial Hygiene Mercury Sampling Correspondence and Data for 81-10 and miscellaneous 9000 buildings (1971-82); IH field reports, A-4 stripping in 1982, #28 copied.

Y/HG-0058 Provision of Clothing to Workers Potentially Exposed to Mercury (10/54)

©✓Y/HG-0059 Specifications for Multiple Hearth Furnace and Excess Report (10/56)

✓Y/HG-0060 Applications for Liquid Waste Discharge Permits from the Corps of Engineers (6/71)

©✓Y/HG-0061 Characterization of Water Treatment Plant Sludge (3/71)

✓Y/HG-0062 Application for Liquid Waste Discharge Permits from the Corps of Engineers (6/71)

✓Y/HG-0063 FY 1971 Annual Progress Report on Air and Water Pollution Abatement Projects (5/71)

✓Y/HG-0064 Water Effluent Data (9/71)

✓Y/HG-0065 Applications for Liquid Waste Discharge Permits from the Corps of Engineers (6/71)

✓Y/HG-0066 Funding for Selected Environmental Activities; letter - Hibbs to Sapirie (12/71)

©✓Y/HG-0067 Solvent Monthly Air Sample Reports for Alpha-2 (9/54 to 12/54) from M-835

©✓Y/HG-0068 Progress Report - Health Physics (11/50 to 12/50) from M-494

©✓Y/HG-0069 Health Physics Progress Report, July 1-December 31, 1951

©✓Y/HG-0070 Internal Correspondence on Stripping of Alpha-5 (1965) #10

©✓Y/HG-0071 Activities Related to Mercury Timeline 1950-66 (6/83) by H. Stoner

- ✓Y/HG-0072 Report of the USAEC Investigating Committee - Loss of Mercury at the Y-12 Plant
on May 28, 1966 (5-13-66)
- ✓Y/HG-0074 Letter requesting Y-12 Personnel to visit Olin Mathieson facilities,
dated January 3, 1956
- Y/ HG-0075 Solvent Urine Program for Alloy Division (8/53)
- Y/HG-0076 Solvent Urine Program for Maintenance Personnel (1/54)
- ©✓Y/HG-0077 Water Flow for East Fork Poplar Creek *for 6-13-55 to 12-30-55 (weekly reports with daily numbers) from M-825*
- Y/HG-0078 Information Transmittal Civil and Architectural Engineering, Y-12 Plant; Title: Sewer Flow Meter at Midway Guard Station (9/55)
- ©✓Y/HG-0079 Water Flow in East Fork Poplar Creek for Period 12/26/55 through 9/9/56 *(weekly reports with daily numbers) from M-826*
- ©✓Y/HG-0080 Health Physics Reports on Solvent for Building 9204-4 (1954) *from M-827*
- ©✓Y/HG-0081 Weekly Solvent Reports Building 9204-4 (1954) *from M-834*
- ©✓Y/HG-0082 Weekly Solvent Reports *Buildings 9201-2 and 9202 (1-54 to 8-54) from M-835*
- ©✓Y/HG-0083 Correspondence: Solvent Usage, Losses, Transfers, Shipping Orders (1953-57); *X-10 solvent transfer (10-27-54)*
- ✓Y/HG-0084 Correspondence: Solvent Shipments, Transfers, and Loans (1956-63)
- Y/HG-0085 Notes on Mercury Contamination in Fish in East Fork Poplar Creek (1970-81)
handwritten notes
- ©✓Y/HG-0086 Notes on Solvent Problem (1955) *for 1956 crash program to reduce mercury levels in Colex buildings; includes ventilation information for A4 and A5 same as in Y/HG-284*
- ✓Y/HG-0087 Letters: "9201-4 Stripping Estimates" (8/74) and "Removal of Mercury from Waste Waters" (7/77)
- Y/HG-0088 Mercury Bottling Estimate Comments (5/75)
- Y/HG-0089 Correspondence and notes regarding attendance by Y-12'ers and ORNL persons at the Conference entitled "Mercury in the Industrial Environment" at Pacific Grove

California (1/72)

✓Y/HG-0090 Notice of Non-Compliance, Y-12 Plant Compliance Evaluation Inspection (3/83)

©✓Y/HG-0091 Correspondence: Letters regarding Mercury Analysis, Contamination, Monitoring Data, reports, 1970 and 1977- #1 is fish, mud and water mercury concentrations in 1971 by M. Sanders

✓Y/HG-0092 Correspondence, Mercury Transfers, Shipping Order and Spillage (1959, 61, 65)

Y/HG-0093 Miscellaneous Correspondence on Mercury Bottling for Alpha-4 (1974,75)

✓Y/HG-0094 Miscellaneous Letters and Worksheets on Mercury Bottling and Disposal (1971-83)

✓Y/HG-0095 Invitation, Bid and Acceptance of Mercury Contaminated Materials (1965-78)

✓Y/HG-0096 Letter, "Declassification of Health and Safety Data Related to Mercury Exposures in Y-12" for NIOSH (6/72)

✓Y/HG-0097 Letter, "Declassification of Health and Safety Data Related to Mercury" (7/72)

©✓Y/HG-0098 Letter, "Estimated Mercury Losses in Creek Waters - 1955 through 1975 from Napier to Smith (5/77) - one of 2 attachments to 1977 Case report from M-477; the source of the 235,000 lb. number

✓Y/HG-0099 Letter "Health and Safety Data Related to Mercury" (11/72)

✓Y/HG-0100 Shipping Orders No. Y-39918 through Y-56085 and Letter, Harris to Terry (1962,63)

©✓Y/HG-0101 Letter, "Suggested Studies for Development Division" from J.S. Reece to R.A. Walker (10/57) - see section on mercury losses

✓Y/HG-0103 Y-12 Urinary Mercury Bioassay Data (12/74)

©✓Y/HG-0104 Letter, "Analysis of Cow Tissue for Total Mercury" (1/83)

©✓Y/HG-0105 Letter, "Analysis of Tissue from Control Animals" (1/83)

©✓Y/HG-0106 Report, "Preliminary Report on Personnel Exposure to Mercury in the Colex Plants" for 1/55 to 3/57 (5/57) - air and urine mercury concentrations from M-243

✓Y/HG-0107 Letter, "Accidental loss of Mercury at Y-12" (6/66) write-off request

✓Y/HG-0108 Letter, "Loss of Mercury at Y-12 Plant" (7/66)

- ✓Y/HG-0109 Letter, "Loss of Mercury at Y-12 Plant" (7/66)
- ©✓Y/HG-0110 Letter, "Report on Contamination in Poplar Creek and the Clinch River" (4/77) from M-843; #4 says Elwood report should be interim and business confidential
- ©✓Y/HG-0111 Letter, "Request for Interpretive Assistance: Mercury in Sediments" (5/83) to Clarkson at Univ. Rochester
- Y/HG-0112 Memorandum of Understanding Between DOE and EPA and Tennessee Department of Public Health (5/83)
- ©✓Y/HG-0113 Letter, "Additional Ventilation for the Beta-4 Cascade" (7/54)
- Y/HG-0114 Poplar Creek Fish Analysis Program for the Determination of Methylmercury, Polychlorinated Biphenyls, and Uranium (10/82)
- ©✓Y/HG-0115 Letter, "Determination of Organic Mercury in New Hope Pond Sediments" (8/82) has analytical information
- ©✓Y/HG-0116 Letter, "Mercury Losses to East Fork Poplar Creek" 1955-82 (5/83) from M-491; information is duplicated from Y/HG-0098 dated 5/77; this copy is identical to the original except for the analytical question of soluble vs. total
- ✓Y/HG-0117 Informal Report, "Comparison of Sediments, Waters and Plant Life in Clinch River Areas of High Mercury Concentrations" (6/83)
- ©✓Y/HG-0118 Letter, "Estimate of Amount of Mercury in the Y-12 Plant Sediment" (7/77)
- ©✓Y/HG-0119 Letter, "Submission of DOE Acquired Data Relating to Metals and Organics Levels in Local Fishery and Sediments" (10/87)
- ✓Y/HG-0120 Letter, "Mercury in Fish in Poplar Creek" (9/76)- 2 letters similar to data letters in Y/HG-121 and "Meeting with TVA Headquarters on Clinch River and Elwood's report" (9/77), from Wing to ERDA says the are pulling in TVA rather than publish Elwood's report", both from M-744
- ©✓Y/HG-0121 Letters, "Mercury content of fish samples - 1976" (8/76)- 3 letters from Morrow to Elwood, one describes method from M-737
- Y/HG-0122 Letter, "Groundwater Monitoring Data" (5/83)
- ✓Y/HG-0123 Report, "Preliminary Report of the Concentrations of Hg, PCBs, and U in Aquatic Organisms from Upper East Fork of Poplar Creek and Elwood" (1/83)

- ©✓Y/HG-0124 Letter, "Literature Information on Mercury" (5/83)- *has mercury toxicity information*
- Y/HG-0125 Letter, "Literature Survey of Population Density Data for Selected Species of Sport Fish in Streams, Reservoirs, and Lakes (11/82)
- ✓Y/HG-0126 Letter/Abstract of Report, "Mercury Contamination of Poplar Creek and the Clinch River" (3-22-77) *by Elwood says total mercury was measured from M-843*
- ©✓Y/HG-0127 Letter on draft Report, "Report on Mercury Contamination in Poplar Creek and Clinch River" (3-22-77)
- ©✓Y/HG-0128 Letter (distribution) of "Report on Mercury Contamination in the Poplar Creek - Clinch River Drainage" (3-22-77)
- ©✓Y/HG-0129 Letter, "Report on Mercury Contamination in Poplar Creek and the Clinch River" (4-77)
- ©✓Y/HG-0130 Letter, "Notes on Meeting in R. G. Jordan's office in April 12, 1977" (4-77) and Comments on Elwood's report by Richmond (3-22-77) *mentions recent potential releases of mercury from Y12, K25*
- ✓Y/HG-0131 Letter, "Comments on Jerry Elwood's Report" (4/77)
- ©✓Y/HG-0132 Cover Letter, "Revised Report on Mercury Contamination in Poplar Creek and the Clinch River" *by Elwood* (5/77)
- ©✓Y/HG-0133 Letter, "Solvent Loss from Tray Vent System, 9204-4 (10/53)
- ✓Y/HG-0134 Letter, "Classification of Mercury" (11/75)
- ©✓Y/HG-0135 Report, "Health Physics Progress Report, Jan.-1953"
- ©✓Y/HG-0136 Report, "Health Physics - Hygiene Progress Report, January 1-31, 1949"
- ©✓Y/HG-0137 Report, "The Industrial Hygiene and Toxicology & Mercury" (1/57) by Univ. Rochester
- ✓Y/HG-0138 Letter "Loan of 988 pounds of mercury to NBS" (3/60)
- ✓Y/HG-0139 Mercury Handling, Flasking, Shipping, Accounting, etc. correspondence (3/63 to 11/81)
- Y/HG-0140 Clinch River and Poplar Creek Fish Sampling Data - Special Sampling Program 1977

Only/"Analysis of Fish Samples" (9/77)

- Y/HG-0141 Correspondence, "Sampling Locations and Identification of Fish Samples Collected for Total Mercury Analysis" by Elwood (8/76)
- Y/HG-0142 Correspondence on "Fish and Sediment Sampling" (8/77, 3/78)
- Y/HG-0143 Correspondence "Analysis of Fish Samples" (3/78)
- Y/HG-0144 Correspondence "Analyses of Fish Samples" (11/77)
- Y/HG-0145 Correspondence, "Analyses of Fish Samples" (9/77)
- ✓Y/HG-0146 Correspondence, "Waste Water Treatment Experiment, Building 9201-4, Work Order No. S-2059-61" (2/77)
- ✓Y/HG-0147 Correspondence, "Purchase Order 30Y-07726V, Mercury Storage Flasks" (12/77)
@✓Y/HG-0148 Correspondence "Industrial Hygiene Field Sampling Reports: 9201-4" (1/77 to 4/77)
- ✓Y/HG-0149 Correspondence, "Eagle Picher Plant, Strip-Out Building 9201-4" (12/75)
- ✓Y/HG-0150 Correspondence Notes on Mercury Flasks, Flasking, Sampling, and Shipping (12/76)
- ✓Y/HG-0151 Annual Report of Radiation Exposures - CY 1972
- Y/HG-0152 Correspondence regarding Mercury Flask Procurement Program (1976)
- ✓Y/HG-0153 Industrial Hygiene Mercury Sampling, 1981-1982
- ✓Y/HG-0154 Correspondence "Colex Hydrogen Vent Gas Analysis" (6/62)
- ✓Y/HG-0155 Correspondence regarding "Excess Mercury Bottles" (1/77 to 9/69)
- ✓Y/HG-0156 Correspondence notes on Mercury Bottling, Handling, Tagging, Storing, Accountability, etc. (5/83)
- ✓Y/HG-0157 Correspondence, Draft Letter "Mercury Spill, March 28, 1966" from Alpha-5 stripper
see Y/HG-0072
- Y/HG-0158 Correspondence "The Chemical and Radiological Characterization of S-3 Ponds"

(7/83)

- ✓Y/HG-0159 Correspondence, Early Colex Training, Staffing, Machine Ship Facilities, Equipment Problems (1st 1/2 1954)
- ©✓Y/HG-0160 Correspondence on Abandonment/Stripping of Alpha-5 Facilities (10/64 to 6/65)
- ✓Y/HG-0161 Fire Engineering Survey, Building 9201-4 (6/70)
- ✓Y/HG-0162 Notes on "Solvent Air Sampling Data - Alpha-5" (for months of 1958); *no monthly avgs, only if avg <.1 or >.1; does give number of values in each range of 0-.1, .1-.2, .2-.3, etc. from M-829*
- ✓Y/HG-0163 Notes on "Solvent Air Sampling Data, Alpha-5" (for 1957) from M-830
- ✓Y/HG-0164 Notes on "Solvent Air Sampling Data, Alpha-4" (for 1957) from M-831
- ✓Y/HG-0165 Trip Reports on Mercury Condition, Flask Conditions, etc. (9/53)
- ✓Y/HG-0166 Notes on Analyses for Total Hg in Samples of Aquatic Bryophytes Along Bear Creek and East Fork Poplar Creek (12/81)
- Y/HG-0167 Compilation of Notes Draft Procedures, Lab Analyses, Training Duties, Purchase Order, H&S Training, etc. for Mercury Flasking Program (1976-77)
- Y/HG-0168 Mercury Flasking Program: Cost Reports (1976-77)
- ©✓Y/HG-0169 Correspondence regarding "Sludge Burner Loss of Solvent and Analysis of Sludge Burner Water" (6/57); *calculations, air samples for 1957, water samples for 1957*
- ✓Y/HG-0170 Memo "Proposals for Reduction of Solvent Leak Contamination for Buildings 9201-4 and 9201-5" *mainly about wrapping plastic around valves, etc.*
- ✓Y/HG-0171 Correspondence "Mercury Hazard Buildings 9201-4 and 9201-5" (11/55) by Little; a "to do" list; also in minutes of one of the SHCMeetings
- ©✓Y/HG-0172 Correspondence, "Recommendations for Sludge Burner from Health Standpoint" (8/57) *includes air sample results for 31 locations, 1959 monthly sheets, not many >2x the MAC.*
- ©✓Y/HG-0173 Air Concentrations in Stacks 9204-4 (10/53)
- ✓Y/HG-0174 Correspondence on Solvent Air and Water Sampling and Frequency, Confidence Levels, etc. (9/56 to 9/59); #3 *discusses 2 analytical instruments (AC and DC);*

proposed reduction in sampling program

- ✓Y/HG-0175 Correspondence on Solvent Flask Storage *in Bldg. 9929-3 (1953)*
- ✓Y/HG-0176 "List No. 2567" Listing Mercury Recipients 3-11-63 thru 5-15-65 and Various Shipping Memos, Reports, etc. (3/63 to 3/65)
- ✓Y/HG-0177 Industrial Hygiene Field Sampling Reports Building 9201-4 (1/77 to 10/77)
- ✓Y/HG-0178 Correspondence on "EPA Proposed National Emission Standards for Hazardous Air Pollutants" (1/72)
- ✓Y/HG-0179 Correspondence on Environmental Monitoring/Committee, Impact Statements, Proposed Standards, Etc. (1972)
- ✓Y/HG-0180 Correspondence on Mercury Transfers Shipping Orders Confirmations, Inventory, etc. (8/79, 5/83)
- ✓Y/HG-0181 Building 9201-5 Stripping: Accounts, Purchase Orders, Bid Acceptance Sheets on Materials Sold, Etc. (2/65 to 4/68)
- ✓Y/HG-0182 "GSA & ERDA Mercury: Broken Pallets" (5/77 to 8/82)
- ©✓Y/HG-0183 Correspondence, Metallic Mercury Vapor in Building 9201-2, *Elex* (1/71) and Mercury Contamination Survey (12/70)
- ✓Y/HG-0184 Correspondence on Mercury Usage Survey/Questionnaire (6/72)
- ✓Y/HG-0185 GSA Mercury Shipments FY 71
- ✓Y/HG-0186 Mercury Shipments FY 1977 - FY 1980
- ✓Y/HG-0187 Contaminated Mercury Sales (6/71 to 5/72)
- ✓Y/HG-0188 Mercury Flasking: Daily Start-up Instructions, Check Weight Instructions, Operating Instructions, Full Flask Weight Checking Instructions, Sampling Instructions, Mercury Shipments, Daily Shut-Down Instructions, and Transfer (1976)
- ✓Y/HG-0189 Mercury Bottling (3/68 to 3/75)
- ✓Y/HG-0190 Correspondence on Excess Mercury Flasking (7000 Flasks) for GSA Stockpile Storage (1/79) and Memo, "Mercury Warehouse Inspection" (9/80)
- ? ✓Y/HG-0191 Solvent Air Analyses (5/57) is a letter discussing statistical reasons for not taking

daily air measurements because mercury concentrations have fallen since 11/56 from M-836

- ✓Y/HG-0192 DOE Mercury Shipping Orders FY 80
- ✓Y/HG-0193 DOE Mercury Shipping Orders FY 81: Material Dispositions, etc.
- ✓Y/HG-0194 Summary Cost Analysis; Profit and Loss Statement (Building 9201-5 Stripping) 5/65 to 1/66
- ✓Y/HG-0195 Correspondence on Computer Evaluations of Death Causes for Oak Ridge, UCND Population (10/74)
- ✓Y/HG-0196 Surface Water Sampling: Jan-Dec 1958; *weekly results with one month per page; EFPC mercury concentrations and total flow; 1260 lbs/week would be 60,370 lbs/yr, compared to Y/HG-0098 1958 number of 66,069; from M-482*
- ©✓Y/HG-0197 Health Physics - Hygiene Progress Report, May 1-31, 1949
- ©✓Y/HG-0198 Health Physics Progress Report, Jan. 1, 1952 to July 1, 1952
- ✓Y/HG-0199 Preliminary Analysis of Mortality Among Y-12 Workers Monitored for Mercury (6/83)
- ✓Y/HG-0200 Building 9204-4 Operations: Procurement Specifications Emergency Procedures, Correspondence, etc. July 2, 1953 through August 18, 1955
- ✓Y/HG-0201 Correspondence on Beta-4 Shutdown and Dismantling (3-29-56 to 7-1-57)
- ✓Y/HG-0202 Excess List Recap/Excess List No. 2567 Hg Flasks (12/62 to 6/65)
- ✓Y/HG-0203 Mercury Return Transmittals, No 7501 and No 7502 (2-5-75)
- ✓Y/HG-0204 Monthly Mercury Pallet Inventory (5/65 - 7/75)
- ✓Y/HG-0205 Transfers from Cascade *filling facility* to Storage (3/68 to 12/75)
- ✓Y/HG-0206 Return of Leaking Flasks (5/65 to 8/72)
- ✓Y/HG-0207 GSA Mercury Stockpile Shipping Orders (7/69 to 5/70)
- ✓Y/HG-0208 Transfers From Mercury Storage Facility (9720-26) to Shipping Department (5/65 to 5/73)
- ✓Y/HG-0209 GSA FY 75 Mercury Bottling Costs

- ✓Y/HG-0210 FY 75 AEC Mercury Shipping Orders
- ✓Y/HG-0211 AEC Mercury Shipments FY 1969, 1970, 1971, and 1972
- ✓Y/HG-0212 "Shipping Orders" and Property Disposition Instructions and/or Transfer Requests for Mercury (7/68 to 6/69)
- ✓Y/HG-0213 GSA Mercury Shipments - Transfers for Mercury Storage Facility (9720-26) to the Receiving and Shipping Department, and Transfer of Flasks from Filling Facility to Excess Storage Area (6/68 to 6/71)
- ✓Y/HG-0214 List 2567 Mercury Shipments FY 1965 (1/65 to 5/65)
- ✓Y/HG-0215 Contaminated Mercury, Building 81-10, Mallory Battery Co. (4/71 to 7/73);*mostly shipping orders; #2 has % Hg in various wastes, such as process filter sludge; ranges from 5, 7, 9 to 32, 45% for the filter sludge.*
- ✓Y/HG-0216 AEC Mercury - Public Sale FY 1966 (6/65 to 11/65)
- ✓Y/HG-0217 Mercury GSA Stockpile FY 1996 (7/65 to 12/66)
- ✓Y/HG-0218 Mercury GSA Stockpile FY 1967 (7/66 to 6/67)
- ✓Y/HG-0219 Mercury GSA Stockpile FY 1968 (7/67 to 6/68)
- ✓Y/HG-0220 GSA Mercury Shipments FY 72 (8/71 to 10/72)
- ✓Y/HG-0221 GSA Mercury Shipments Shipping Orders, FY 73 (12/72 to 6/73)
- ✓Y/HG-0222 GSA Mercury Shipping Orders, FY 74 (7/73 to 6/74)
- ✓Y/HG-0223 GSA Mercury Shipping Orders, FY 75 (6/74 to 11/74)
- ©✓Y/HG-0224 Summary of Behavior of Mercury in Suspended Solids and Bottom Sediments (7-26-76) by Univ. TN; *has information on chemical forms of mercury*
- ✓Y/HG-0225 Mercury Donations Shipped; 10,000 Flasks to State Agencies (12/64 to 4/65)
- ✓Y/HG-0226 Hg Bottling Lab Analysis with Pallet Card (10/77 to 1/80)
- ✓Y/HG-0227 AEC Mercury Shipments - Shipping Orders FY 73 (8/72 to 12/73)
- ✓Y/HG-0228 Certification of Compliance (Mercury Flasks fabricated by Norris Industries for Y-12) 5/77 to 9/77

- ✓Y/HG-0229 Certification of Compliance (Mercury Flasks fabricated by Norris Industries for Y-12)
3/77 to 4/77
 - ✓Y/HG-0230 Certification of Compliance (Mercury Flasks fabricated by Norris Industries for Y-12)
1/77
 - ✓Y/HG-0231 Certification of Compliance (Mercury Flasks fabricated by Norris Industries for Y-12)
11/76 to 12/76
 - ✓Y/HG-0232 Certification of Compliance (Mercury Flasks fabricated by Norris Industries for Y-12)
2/77
 - ✓Y/HG-0233 Notices of Inspection of *mercury flasks* (6/76 to 11/76)
 - ✓Y/HG-0235 Mercury Shipments (Transfer requests for Mercury flasks to be moved from the Mercury Storage Facility to the Shipping and Receiving Department) 1/71 to 11/74
 - ✓Y/HG-0236 Mercury Shipments (Requests for flasks to be moved from the Mercury Storage Facility to the Shipping and Receiving Department) 2/67 to 6/68
 - ✓Y/HG-0237 Mercury Shipments (Requests for flasks to be moved from the Mercury Storage Facility to the Shipping and Receiving Department) 7/66 to 1/67
 - ✓Y/HG-0238 Mercury GSA Shipments Transmittal #1 (Requests for flasks to be moved from Mercury Storage Facility to Receiving and Shipping Department) 7/65 to 6/66
 - ✓Y/HG-0239 GSA Monthly Pallet Inventory 8/65 to 2/79
- ©✓Y/HG-0241 Correspondence on "Mercury Vapor in Building 9201-2"; *5 letters from 1971,72,76*
- ✓Y/HG-0243 Correspondence "Reclassification of ADP(*Alloy Development Program*) Mercury"
4/56, 5/56; *change classification from' current us stores' to 'other special materials'*
 - ✓Y/HG-0244 Correspondence "Research Conference on Mercury and Mercurials (3/56); *one letter*
 - ✓Y/HG-0245 Correspondence "Research Conference on Mercury and Mercurials" (1955); *4 letters*
- ©✓Y/HG-0246 Correspondence "Stripping of Building 9201-5 Personal Protections and Scrap Disposal" (2/65 to 7/65)
- ✓Y/HG-0247 Request for KT-542 *document, Purification of Mercury Contaminated LiOH (11/61); see also Y/HG-0016*
 - ✓Y/HG-0248 Development - Fabrication Divisions Safety Meeting Minutes, July 10, 1979

- ✓Y/HG-0249 Mercury Sampling Program; Building 9201-4
- ✓Y/HG-0250 Demolition and Construction Activities on Machine Cleaning Area...Building 9201-4 (1982)
- ✓Y/HG-0251 Industrial Hygiene Sampling of 9204-2E Operation (1983)
- ✓Y/HG-0252 Correspondence regarding "Financial Depreciation of ADP Solvent" (7/55)
- ✓Y/HG-0253 Adequacy of AEC Evaluation of Y-12 Hazards (6/56); *about a 5-14-56 zirconium explosion when 2 were killed; accident summary mentioned is not attached; see also Y/HG-509*
- ✓Y/HG-0254 Correspondence, "Evaluation of Y-12 Hazards" (7/56)
- ✓Y/HG-0255 Letter Emlet to Murray on "Y-12 Hazards"
- ©✓Y/HG-0256 Radioactive Effluent Monitoring and Control
- ©✓Y/HG-0264 *Mercury Purchases and Sales; annual receipts of mercury in hundreds of thousands of flasks*
- ✓Y/HG-0265 *Mercury Adjustment; costs (9-22-78)*
- ✓Y/HG-0269 Y-12 Hazards (7/56)
- ✓Y/HG-0271 Alpha-5 Stripping Maintenance Activities and Statistics (4/65 to 8/65)
- ✓Y/HG-0272 Industrial Hygiene monitoring at 2nd floor office areas Building 9201-4 (3/78)
- ©✓Y/HG-0274 Removal of Equipment and Abandonment of Building 9201-5 (5/64 to 9/67); */12 discusses stopping D&D operations for the summer due to high air concentrations of mercury*
- ✓Y/HG-0275 Program Cost Changes Resulting from Proposed Alpha-4 Shutdown (9/62)
- ©✓Y/HG-0276 Shutdown of Alpha-4 Plant (10/62)
- ✓Y/HG-0277 Alpha-4 Operation Study (6/65)
- ©✓Y/HG-0281 Solvent Losses Through Ventilation Exhaust Systems, Building 9201-5 (3-14-56); *The Little Report, one of the 2 attachments to the 1977 Case report*
- ✓Y/HG-0283 Mercury Correspondence, Surveys, Removal Storage, and Studies (6/72 to 12/77)

- ©✓Y/HG-0284 Solvent Hazards Committee Meeting, No. 5 (12-19-55); *are attachments and drawings on ventilation air changes for A4 and A5*
- ©✓Y/HG-0285 Decontamination Memo No. 1 - Rubber Overshoes *from M-487*
- ©✓Y/HG-0286 Decontamination Memo No. 2 - Flange Gaskets
- ©✓Y/HG-0287 Decontamination Memo No. 3 - Use of Tobacco
- ©✓Y/HG-0288 Decontamination Memo No., 4A - Supersedes Decontamination Memo No. 4 - Revised Solvex and Raffinate Pump Replacement Procedure
- ©✓Y/HG-0289 Decontamination Memo No. 5 - Kinney, Pump Drain Valve
- ©✓Y/HG-0290 Decontamination Memo No. 6 - Field Replacement of Alpha-4 Raffinate Pump Stators
- ©✓Y/HG-0291 Decontamination Memo No. 7 - Leak Collection Buckets
- ©✓Y/HG-0292 Decontamination Memo No. 8 - Cleaning of Rubber Shoes and Overshoes
- ©✓Y/HG-0293 Decontamination Memo No. 9 - Dismantling Recommendations for Solvex and Raffinate Pumps
- ©✓Y/HG-0294 Decontamination Memo No. 10 - Recommended Use of Mersorb Respirators
- ©✓Y/HG-0295 Decontamination Memo No. 11 - Recommended Housekeeping Procedure
- ✓Y/HG-0296 Test at Building 9201-5 to Determine Effect of Temperature on Air Contamination in Operating Areas (12-23-55)
- ✓Y/HG-0298 Specification for Mercury Vapor Respirators
- ✓Y/HG-0299 The Use of Floor Sealers and Waxes in the ADP Buildings *from M-487*
- ✓Y/HG-0300 Waste Water Disposal Practices (2/64)
- ✓Y/HG-0301 Waste Water Disposal Practices (2/64)
- ✓Y/HG-0302 Waste Water Disposal Practices (4/66)
- ✓Y/HG-0303 Inspection by USPHS of Union Carbide Facilities in Oak Ridge--Review of Waste Water Treatment and Radioactivity in Effluents (9/65)



General Urine Excretion Averages for the Alloy Division in 1955

©✓Y/HG-0305 Mercury Hazard Committee Meeting, *pre SHCM No.1* (11-21-55)
DEL REV

✓Y/HG-0306 Solvent Hazard Committee Meeting - No. 1 (<11-30-55); *should be an attached report on all ventilation system changes*

✓Y/HG-0307 Solvent Hazard Committee Meeting - No. 2 (11-28-55)

✓Y/HG-0309 Solvent Hazard Committee Meeting - No. 4 (12-12-55)

✓Y/HG-0310 Solvent Hazard Committee Meeting - No. 7 (1-16-56); *says cold weather experiment isn't working*

✓Y/HG-0312 Solvent Hazard Committee Meeting - No. 9 (1-30-56)

©✓Y/HG-0314 Solvent Inventory, Building 9201-2 (12/57)

Y/HG-0315 Solvent (3/58)

Y/HG-0316 Solvent (6/58)

Y/HG-0318 Effluent Reduction Program - Phase II "Statistical Data on Costs of Solid Waste Burial" and "Updating of Waste Management Plans" (1972)

✓Y/HG-0319 Telephone Conversation with Dr. W. C. Gardiner of Olin Mathieson (12/55)

✓Y/HG-0320 Specification and Usage Requirements for Mercury Vapor Respirators (5/56)

✓Y/HG-0321 Use and Decontamination of Mercury Vapor Respirators (5/56)

✓Y/HG-0322 Committee to investigate apparent loss of mercury at the Y-12 Plant (5/56)

©✓Y/HG-0323 Report of investigating committee; loss of special nuclear material (lithium) at Y-12 Plant on January 15, 1965; *continues on page 7*
Conclusion, but not Part 1, ORO-125208, which discusses incident of spill loss of lithium hydroxide from an open pipe; from M-478

✓Y/HG-0327 Review of the ADP Program (7/55)

✓Y/HG-0328 ADP Area, Building 9204-4 (8/55)

✓Y/HG-0329 Separate Process Ventilation System for Vertical Strippers

- ✓Y/HG-0330 Spare Absorber Rectifier Stacks (9/53)
- ✓Y/HG-0331 *Resume of Beta-4 Accountability Meeting (7-15-54)*
- ✓Y/HG-0332 Test of Nitrogen in Beta-4 (8/54)
- ✓Y/HG-0335 New Pumps for Make-up Process Water System, Building 9204-4 (9/53)
- ©✓Y/HG-0338 Summary of Changes in Auxiliary Systems for Beta-4 Expansion (9/53)
- ©✓Y/HG-0341 Solvent Inventory Material Balance (6/53 to 9/53); see Y/HG-530, -534 from M-602
- ✓Y/HG-0346 AEC Audit Report No. 1-2-2, Management of Capital Assets (5/62)
- ©✓Y/HG-0347 Sump Study
DEL
- ✓Y/HG-0360 Removal of Mercury from Nitric Acid Wash Solutions
- ©✓Y/HG-0362 *Solvent Roaster Procedure (date unknown)*
- ✓Y/HG-0365 Disposal of Mercury and Equipment, Building 9201-4; *mentions 1965 spill of 50,000 lbs. of mercury*
- ✓Y/HG-0366 Basis for March 1972 Mercury Bottling Estimate
- ✓Y/HG-0367 Hg Bottling Cost (2/72)
- ✓Y/HG-0368 Mercury Storage Space Requirements (3/72)
- ✓Y/HG-0370 Mercury Bottling Costs (2/74)
- ©✓Y/HG-0372 *History of Handling Excess Mercury by the Y-12 Materials Dept. in Building 9720-26 (sometime > 1976)*
- ✓Y/HG-0374 Purity of Mercury in the Colex System (2/60)
- ✓Y/HG-0383 Classification of Process Material
- ✓Y/HG-0386 *Mercury Inventory: September 1976 in dollars*
- ✓Y/HG-0396 *Results of Vent Gas Filter Tests (for alloy/lithium)-Beta-4 Elex Plant (10-13-54)*

- ✓Y/HG-0398 Graphite for Decomposers (12/56)
 - ✓Y/HG-0399 Failure of Bolts on Solvex Valve (11/56)
 - ✓Y/HG-0400 Purchase of Acetylene Generator (9/54)
 - ✓Y/HG-0401 Materials of Construction Rubber and Plastics - U. S. Rubber Co. Types 5023 and 5352 (?)
 - ✓Y/HG-0402 Alpha-5 Decomposer Graphite Sizing Tests (8/54)
 - ✓Y/HG-0403 Preparation of Dicyclohexylamine Caprylate Solution (6/54)
 - ✓Y/HG-0404 Tests of Cameron Valve Seats (?)
 - ✓Y/HG-0405 Descaling Acid Inhibitors (6/54)
 - ✓Y/HG-0406 Report on U.S. Rubber Co., Providence Plant (Rubber Types 5023 and 5352)
 - ✓Y/HG-0408 Effect of Temperature on Air Conditioning in Operating Area; winter and summer
 - ①✓Y/HG-0413 Solvent Recovery Progress Report Week Ending August 8, 1953; 5 to 7/53 from M-810: 1009 lb. of solvent recovered from B-4
 - ①✓Y/HG-0414 Solvent Recovery Progress Report Week Ending August 2, 1953; 8/53 from M-810: alloy recovery in B-4
 - ④✓Y/HG-0418 Solvent Recovery Process Drawings (7/53); B-4 from M-810; there are no drawings in this folder.
 - ✓Y/HG-0430 Alpha-4 Mercury Inventory (3-6-68)
 - ✓Y/HG-0431 Mercury Inventory Loss by J.M. Case
 - ✓Y/HG-0432 Mercury Inventory Loss (8-22-68)
 - ✓Y/HG-0433 Mercury Inventory Loss
 - ✓Y/HG-0434 Mercury Inventory Loss (11-14-68)
 - ✓Y/HG-0435 Results of Vent Gas Filter Tests - B-4 from M-810

(C) ✓

-0436/del rev

- ©✓Y/HG-0437 Poplar Creek Contaminants (12/56); contains EFPC mercury concentrations and EFPC flow rates for 3rd quarter 1954 through 4th quarter 1956 that are not cited in Y/EX-24

Y/HG-0439 Progress Report for the Week Ending July 19, 1953

©✓Y/HG-0440 Progress Report for May 25 to July 11, 1953 for Beta-4 Chemical Recovery Area; 7/53 mentions existence of a solvent roaster procedure; from M-810.

✓Y/HG-0441 Progress Report for the week of July 6 to July 12, 1953 for Beta-4 Chemical Recovery Area; 7/53 on B-4 alloy recovery; from M-810.

✓Y/HG-0442 Chemical Recovery Salvage (8/54); B-4 alloy recovery; from M-810.

©✓Y/HG-0445 Solvent (3-13-58)

✓Y/HG-0446 Charge-Off of Pilot Plant Solvent Loss to Prior Years' Cost (3/58)

©✓Y/HG-0447 Solvent (6-27-58)

©✓Y/HG-0453 Building 9204-4 Solvent (10/53)

©✓Y/HG-0454 Solvent Inventory (11/53)

©✓Y/HG-0455 Feed Salt and Solvent Status (9-1-54)

✓Y/HG-0456 Feed Salt and Solvent Status (10-1-54)

✓Y/HG-0457 Raw Materials, Special Materials, and Solvent Inventory, Account 2692, October 1, 1954

✓Y/HG-0458 Raw Materials, Special Materials, and Solvent Inventory, Account 2692, November 1, 1954

✓Y/HG-0459 Feed Salt and Solvent Status (no date)

✓Y/HG-0460 Raw Materials, Special Materials, and Solvent Inventory, Account 2692, December 1, 1954

✓Y/HG-0461 Raw Materials, Special Materials, and Solvent Inventory, Account 2692, January , 1955

✓Y/HG-0462 Raw Materials, Special Materials, and Solvent Inventory, Account 2692, February 1, 1955

✓ 0463

5

Raw Materials, and Solvent Inventory, Account 2692, March 1,

- ✓Y/HG-0464 Raw Materials, Special Materials, and Solvent Inventory, Account 2692, April 1, 1955
- ✓Y/HG-0465 Raw Materials, Special Materials, and Solvent Inventory, Account 2692, May 1, 1955
- ✓Y/HG-0466 Raw Materials, Special Materials, and Solvent Inventory, Account 2692, June 1, 1955
- ✓Y/HG-0467 Raw Materials, Special Materials, and Solvent Inventory, Account 2692, July 1, 1955
- ✓Y/HG-0468 Raw Materials, Special Materials, and Solvent Inventory, Account 2692, August 1, 1955
- ✓Y/HG-0469 Raw Materials, Special Materials, and Solvent Inventory, Account 2692, September 1, 1955
- ✓Y/HG-0470 Raw Materials, Special Materials, and Solvent Inventory, Account 2692, October 1, 1955
- ✓Y/HG-0471 Raw Materials, Special Materials, and Solvent Inventory, Account 2692, November 1, 1955
- ✓Y/HG-0475 Mercury Packaging Procedure (1/65)
- ✓Y/HG-0479 Mercury Containers; 9201-1, a fabrication estimate
- ✓Y/HG-0482 Stripping Alpha-4; Estimate
- ©✓Y/HG-0489 Correspondence on mercury bottle filling and contamination; 1977 bottling overage- uncertainty; 12/77 - 1978
- ©✓Y/HG-0490 Solvent inventory and transfer (2-12-53); CTF and B-4; from M-602
- ©✓Y/HG-0499 81-10 Operations on solvent contaminated glassware
- ✓ ~0500 - chemical analysis 1960-1970
- ✓ TIG-0501 Request for certified test results for alpha-4

Y/HG-0502 Bottling and handling costs related to excess mercury (3/66)

©✓Y/HG-0503 Alpha-5 operations correspondence (1956)

✓Y/HG-0504 Beta-4 operations correspondence (1953,54)

✓Y/HG-0505 ADP program study (5/56)

✓Y/HG-0506 Solvent bottling and storage (1959-63)

©✓Y/HG-0509 Adequacy of AEC Evaluation of Y-12 Hazards (3/56) *contains accident summary for 1956; see also Y/HG-0253 and 0269*

©✓Y/HG-0511 Mercury for *Elex* Alloy Development Plant (4-25-52)

©✓Y/HG-0512 Mercury for *Elex* Alloy Development Plant (9-5-52)

©✓Y/HG-0513 Mercury for *Orex* ADP Process Development (10-10-52)

©✓Y/HG-0514 Mercury for *Orex* Alloy Development Plant (3-18-53)

©✓Y/HG-0515 Test for Mercury Vapor Concentration and CO₂ Absorption of LiOH

✓Y/HG-0516 Visit to the Lithium Corporation of America, Minneapolis, Minnesota (12-11-53)

✓Y/HG-0517 Summary of Aspen Salvage Meeting

✓Y/HG-0518 Graphite for Colex Decomposers

Y/HG-0520 Purification of uranium by secondary carbetol extraction

✓Y/HG-0521 Solvent available

✓Y/HG-0522 *Shower Study (1-9-56); from Leo LaFrance to W.K.Whitson*

✓Y/HG-0523 Building 9201-4 Ventilation Equipment Survey (4/76)

✓Y/HG-0524 Calculation of Stage Length from Batch Exchange Data (2/53)

✓Y/HG-0525 Estimate of Target Feed Salt Usage (11/56)

©✓Y/HG-0526 *Alpha-5 Ventilation Data/Drawings (1955)*

Y/HG-0527 *Alloy Stack Samples (1955-57)*

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424
- 44
468
— 2 ^{def}
41
+ 44 E
426
+ 29 E
397

11-6-96
S.M.Flaack

HSEA Monitoring

Surface Water Group "Data Room" (Room 7-2020)

Biology Building, 9207

Kim Henzelka 4-1599 has key

GW group is in same building - Beth Rundle is contact (no key)

has 1961-1996 data

1. field notebooks 1988-91, 1995 Upper EFPC ONT sw+sed weather dry/wet

2. chain of custody cards

3. Environmental Monitoring/ Surveillance Reports 1973-92
77,78,79,81 missing

4. Environmental Surveillance Section procedures manuals

5. Special Projects Files 1987-92 (reviewed logbooks)

1000 H₂O

2000 air

3000 soil

4000 other

5000 RFI

6000 spills

files of potential interest:

1023 NHP

1025 "

1029 "

1065 Hg Stn. 17

1072 Hg

3054 old steam plant closure

- 3079 Y-12 scrapyard soil
- 3122 Hg soil stockpile at B-3
- 3142 NTP closures
- 6067 outfall S8 Hg grabs
- 6151 runoff from Bldg 81-10

$5\frac{1}{2}$ "

6. diskettes and Bernoulli disks

1986-90

NPDES disks

Envir. Surv. Reports

back-up

Hg data, NTP, St. 17

charts

dbaseIV

W. Perfect Software programs

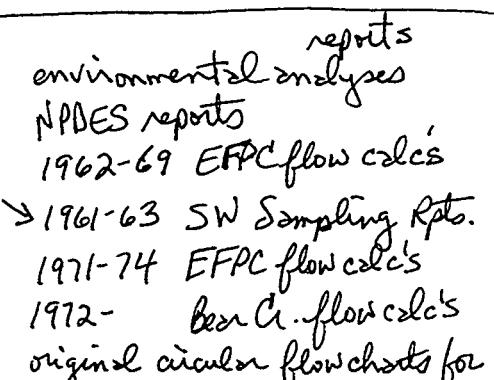
7. correspondence

1989-90 gw

8. 1961-1994 historical data files

(C)

Copied



9. meteorological data strip charts and computer printouts

1

1991-95

1989-95

EFPC
2nd
BC
for some
years.

1988 called Station 17

sheets
flow calc.

1975-86

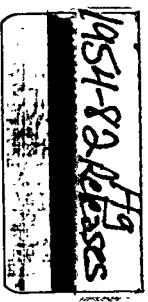
1983 - Rogers Quarry
1987 - Kerr of flow calc's

Hollow flows
(EF) Poplar C. called NTP now
(1987)

10. folders

24 H₂O main break 6-22-83 - H₂O in fan rooms

- (A) copied weir chart
and sampling plan NHP samples - no Hg May 83 S Pipe
Wilcox Task Force Study - Sampling NHP in, out; NPipe,
- (B) copied Felt to Hickman
memos 81-10 decon; Mercury Study - 1983 R. Turner's sampling
Hg TForce recommends;
AND graph of [Hg] 1967-82 EPPC 24 fire service H₂O line break 1-12-84 ≤ 8.5 ppb MAX. @ NHP
outlet



October 15, 1996

Steve Wiley
Lockheed Martin Energy Systems
P.O.Box 2009
Oak Ridge, TN 37831

RE: Request for Letter

Dear Steve:

ChemRisk requests a copy of a letter dated December 10, 1982 from G.G. Fee, Y-12 Plant Manager, to H.D. Hickman, Department of Energy, Oak Ridge Operations which is cited on page 113 of the 1983 Mercury Task Force Report (Y/EX-21/del rev).

Sincerely,



Susan Flack
Senior Associate Health Scientist

MS

UNION CARBIDE CORPORATION
NUCLEAR DIVISION
P. O. BOX Y, OAK RIDGE, TENNESSEE 37830

December 10, 1982

Department of Energy
Oak Ridge Operations
Attention: Mr. H. D. Hickman
Post Office Box E
Oak Ridge, Tennessee 37830

Gentlemen:

FOI Request, Mercury Emissions

Reference is made to J. F. Wing's letter of November 30, 1982, requesting the subject information from the Y-12 Plant Environmental Coordinator, Merwyn Sanders. Enclosed are the mercury water analyses from the outfall of New Hope Pond, the headwaters of East Fork Poplar Creek, from 1954 through 1982.

Questions concerning the enclosed data can be addressed to Merwyn Sanders, telephone 4-3546.

Very truly yours,

Gordon G. Fee

Gordon G. Fee, Plant Manager
Oak Ridge Y-12 Plant

GGF:MS:eh

Enclosure: Mercury Water Analyses

cc: G. G. Fee
R. F. Hibbs
L. J. Peacock
J. C. White

cc/enc: H. D. Hickman
H. H. Stoner/M. Sanders - RC
J. F. Wing, DOE-ORO

WATER SAMPLE RESULTS TAKEN FROM EAST FORK POPLAR CREEK

1974-1982--Method of Analysis:

Economic Absorption

Limit of Error: +20% at 0.001 mg/L
Quality Control Program from 1979 to Present).

1957-1973--Method of Analysis:
WATER SAMPLE RESULTS TAKEN FROM EAST FORK POPLAR CREEK
(Mercury Mg/L)

WATER SAMPLE RESULTS TAKEN FROM EAST FORK POPLAR CREEK
(Mercury Mg/L)

<u>YEAR</u>	<u>JAN.</u>	<u>FEB.</u>	<u>MAR.</u>	<u>APR.</u>	<u>MAY</u>	<u>JUNE</u>	<u>JULY</u>	<u>AUG.</u>	<u>SEPT.</u>	<u>OCT.</u>	<u>NOV.</u>	<u>DEC.</u>
1970	<.01	.01	.01	.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
	<.001		<.0002	<.0002	<.1	<.10	<.1	<.10	<.1	<.10	<.001	<.001
			<.01	<.0002	<.001	<.1	<.001	<.001	<.1	<.1	<.001	<.0001
			<.0001			<.0010			<.001		<.001	
1969	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
		<.0002		<.0002		<.0002		<.0002		<.0002		<.0002
		<.0004										
		<.0002										
1968	<.01	<.01	.01	.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
	.0002	.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002
	.0002	.0002	<.0002	<.0002								
1967	.05	.05	.01	.049	.049	<.049	<.049	.049	<.01	<.01	<.01	<.01
	.05	.05				<.05	<.05	.0002	<.05	<.0002	<.0002	<.0002
						<.05	<.05					
1966	<.05	--	--	--	--	--	--	--	--	--	<.05	<.01
1965		<.05	<.05	<.05				.4115	<.05	.05	<.05	<.05
1964	.034	.011	.015	.013	.004	<.05	.027					
	.33	.12	.05	<.05								
	.010	.31	.022	<.050	.013							
	.026	.10	.010	.021	.010	.05						
	.006	.032										
	.11											
1963	.016	--	--	--	--	--	--					

WATER SAMPLE RESULTS TAKEN FROM EAST FORK POPLAR CREEK
(Mercury Mg/L)

YEAR	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
	1962	--	.28	.26	.16	.10	.06	.01	.02	.01	.06	.06
		.34	.21	.12	.27	.01	.02	.01	.04	.04	.20	.10
		.16	.13	.16	.04	.05	.03	<.01	.04	.04	.06	<1.0
					.01	.02	.003	<.01	.06	.03	.08	<1.0
					.06	.01		<.01			.01	
1961	.05	.07	.16	.20	.12	.06	.26	.36	.42	.32	.10	.09
	.20	.16	.10	.15	.10	.09	.08	.08	.10	.11	.15	.12
		.28	.09	.10	.09	.07	.05	.17	.18	.08	.13	.05
			.04	.18	.07	.08	.16	.33	.29		.09	.08
									.51			.10
1960	.18	.09	.05	.23	.16	.21	.15	.23	.12	.22	.19	.10
	.04	.17	.51	.24	.12	.19	.16	.18	.14	.27	.27	.13
		.16	.18	.29	.34	.18	.15	.99	.16	.33	.15	.15
		.24	.14		.13	.12	.27	.14	.09	.85	.40	.07
					.23		.13	.14	.14			.03
1959	.7	1.6	.68	.9	1.5	.4	1.3	.6	.2	.24	.30	.33
	1.3	1.0	.9	.7	1.1	.3	1.4	1.7	.1	.22	.09	.13
		.7	1.5	1.2	.5	.5	.9	.3	1.7	.21	.10	.14
		.8			1.1	.3	.4	.6	.2	.19	.30	.19
		1.3				.7				.24		.08
1958	1.2	3.4	2.1	4.1	2.6	.9	2.4	.9	1.3	6.0	.75	1.2
	3.1	3.7	3.0	1.5	14.5	1.4	1.3	1.0	1.0	.49	.6	1.0
	2.9	3.2	5.8	3.9	2.10	1.3	2.0	2.0	.8	.898	.6	2.4
	3.4		1.3	1.2	2.0			1.2	1.7	1.67	1.3	.6
	10.7				2.0				1.4		.91	
1957	1.7	2.6	2.3	2.54	.920	1.6	3.4	4.3	1.6	.53	1.60	1.40
	1.51	1.9	1.7	2.2	3.2	4.12	1.7	5.0	2.0	1.0	2.80	2.80
	1.7	1.7	1.3	4.03	3.8	1.5	7.2	5.2	1.4	2.30	3.40	1.70
	1.17	1.20	1.74	2.0	1.2	2.1	3.8	1.5	1.4	1.30	1.24	2.39
			1.4							3.2		1.10

WATER SAMPLE RESULTS TAKEN FROM EAST FORK POPLAR CREEK
Analysis: (Mercury Mg/L)

III to 1957--Method of Analysis:

Colorimetric

Limit of Error: \pm 50% at 10 mg/L

<u>YEAR</u>	<u>JAN.</u>	<u>FEB.</u>	<u>MAR.</u>	<u>APR.</u>	<u>MAY</u>	<u>JUNE</u>	<u>JULY</u>	<u>AUG.</u>	<u>SEPT.</u>	<u>OCT.</u>	<u>NOV.</u>	<u>DEC.</u>
1956	.38	<.1	.40	.44	.74	1.03	1.17	1.17	3.6	.5	.94	.74
	.43	.27	.46	.32	.70	1.31	.56	.67	.8	1.3	.74	.87
	.32	.18	.10	.55	.42	.37	.95	1.19	.8	1.1	.71	.71
	.36	.34	.78	.55	.58	.89	1.32	2.31	1.4	.48	.79	
						.45		3.60	3.6		.96	
											.94	
											.78	
											2.0	
											1.5	
1955	.15	.59	1.09	1.48	1.98	1.93	1.06	1.05	1.28	.44	.74	.23
	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	1.16	.33	.71	.40
									1.89	.73	.79	.57
									1.07	1.08	.96	1.48
									.84	.84		.63
1954	--	--	--	.28*	.10*	.23*	.23*	.13*	.54*	.25*	.191*	.14*

*Avg. monthly concentration in EPFC at east end of Y-12, expressed in Mg solvent/liter H₂O

During 1951-1963, water samples were obtained by a Tribullar proportional sampler for mercury in Y-12's industrial ditch. Since 1963, all other results were obtained from the effluent of New-Hope Pond.

12-7-82
RTW/N/S/eh

X from
box (4) #5

ChemRisk/Shonka Research Associates, Inc., Document Request Form

(This section to be completed by subcontractor requesting document)

Susan Flack / CEP

Requestor

Document Center (is requested to provide the following document)

Date of request 3/17/95 Expected receipt of document 3/31/95

Document number none Date of document 9/21/83

Title and author (if document is unnumbered)

Fee, G.O. Y-12 Documentation on Mercury.

(copy cover letter only)

(This section to be completed by Document Center)

Date request received 6/19/95

Date submitted to ADC 6/20/95

Date submitted to HSA Coordinator 6/20/95

(This section to be completed by HSA Coordinator)

Date submitted to CICO (Y-12) 6/20/95

Date received from CICO (Y-12) 6/23/95

Date submitted to ChemRisk/Shonka and DOE 6/28/95

(This section to be completed by ChemRisk/Shonka Research Associates, Inc.)

Date document received _____

Signature _____

Document No.

Y/TS-1357

Author's Telephone No.

6-0263

Acct. No.

23660003

Date of Request

6/20/95

Unclassified Title: Y-12 DOCUMENTATION ON MERCURY
(CORRESPONDENCE)

Author(s) Requestor: Steve Wiley

TYPE: Formal Report Informal Report Progress/Status Report Co-Op Report Thesis/Term Paper Oral Presentation (Identify meeting, sponsor, location, date): _____ Journal Article (Identify Journal): _____ Other (Specify): To Be Released to ChemRisk, Phase IIDocument will be published in proceedings No YesDocument will be distributed at meeting No YesDocument has patent or invention significance No Yes (Identify) _____Document has been previously released No Yes (Reference) _____

DIVISION REVIEW AND APPROVAL (Completed By Requesting Division)

TECHNICAL CLASSIFICATION REVIEW (Divisional Classification Representative)

Title(s): U Abstract: _____

DOCUMENT REQUEST APPROVED (Division or Department)

DOCUMENT: Level U Category: _____

Signature

6/20/95
DateG.7-Boyer
Signature Date 6/21/95

Signature

Date

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TIO File L.L. McCauley

S.W. Wiley

R.M. Keyser

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M-3679 Category _____

ANNOUNCE IN: AWDR (Available from OSTI) ANCR

Distribution Remarks: Cleared for Public Release (ChemRisk)

APPROVAL AND RELEASE

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Date Initiated

6/20/95

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 waived

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Date

Date

Date

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DOCUMENT:

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Weapons Data Sigma -

Y-12 Classification Office 6-23-95

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4/23/95
Date

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ASZ

Y/TS-1357



UNION CARBIDE CORPORATION
NUCLEAR DIVISION
P. O. BOX Y, OAK RIDGE, TENNESSEE 37830

September 21, 1983

Department of Energy
Oak Ridge Operations
Attention: Mr. H. D. Hickman
Post Office Box E
Oak Ridge, Tennessee 37830

Gentlemen:

Y-12 Documentation on Mercury

Per your telephone conversation with J. C. White today, I am transmitting copies of two documents:

- (1) Letter, G. G. Fee to H. D. Hickman, dated October 27, 1982,
"Mercury Contamination in East Fork Poplar Creek and Bear Creek"
- (2) Memorandum, J. M. Napier to D. W. Smith, dated May 5, 1977,
"Estimated Mercury Losses in Creek Waters - 1955 through 1975"

Please transmit these documents to Mr. Robert Nicholas, Investigations and Oversight Subcommittee, House Committee on Science and Technology, House Annex 1, Room 822, Washington, D.C. 20515. He requested these documents from me via a telephone message on September 20, 1983.

Very truly yours,

A handwritten signature in cursive ink that appears to read "Gordon G. Fee".
Gordon G. Fee, Plant Manager
Oak Ridge Y-12 Plant

GGF:JCW:1pm

Enclosures (2)

cc/enc: G. G. Fee - RC
R. F. Hibbs
H. D. Hickman
C. R. Richmond
W. J. Wilcox, Jr.
L. F. Willis



UNION CARBIDE CORPORATION
NUCLEAR DIVISION
P. O. BOX Y, OAK RIDGE, TENNESSEE 37830

BS

UNCLASSIFIED

October 27, 1982

Department of Energy
Oak Ridge Operations
Attention: Mr. H. D. Hickman
Post Office Box E
Oak Ridge, Tennessee 37830

Gentlemen:

Von Hippel
Mercury Contamination in East Fork Poplar Creek and Bear Creek

You recently received a copy of ORNL/CF-82/257, "Mercury Contamination in East Fork Poplar Creek and Bear Creek," issued September 7, 1982, which was a report of a study conducted by the Oak Ridge National Laboratory at our request. It should be noted that the authors included statisticians and laboratory personnel from the Y-12 Plant, as well as environmental scientists from ORNL. This study was undertaken after we had reviewed data on these creeks that had been obtained early in 1982. That data indicated the mercury concentration to be well above normal background levels. We had previously discussed the preliminary findings of this report with you. We also stated at that time that we would be making recommendations concerning the conclusions and recommendations reached by the authors when the final report was received.

This letter addresses these recommendations and the actions that we already have under way in some cases.

"4.2.1 Specific Actions

1. Consider the following actions to limit the quantity of mercury lost with sediments from the Y-12 Plant area:
 - a. identify, decontaminate, and stabilize (or physically isolate) the area(s) yielding mercury-contaminated sediments to New Hope Pond; and
 - b. design and implement future dredging plans for NHP to minimize sediment resuspension and loss to EFPC."

We concur with Part 1.a. and, indeed, have programs under way to enhance our knowledge of the source and quantity of mercury lost from the Y-12 Plant. A study to determine (1) the location(s), forms, and rate of

DOE, Mr. H. D. Hickman
Page 2
October 27, 1982

mercury release; and (2) if New Hope Pond acts as a source or sink for mercury during normal and storm flows has been initiated and should be completed about June, 1983. Following this study, recommendations for additional analysis and/or action will be made. As for Part 1.b., New Hope Pond was last dredged in 1972. We are awaiting the results of the study under way prior to making a decision regarding future dredging of New Hope Pond.

"2. Consider the following actions in light of mercury concentrations found in fish in EFPC:

- a. notify the Tennessee Department of Public Health of the mercury contamination of fish in EFPC; and
- b. post DOE property at those locations along EFPC used by bank fishermen and boat fishermen."

The Tennessee Department of Public Health has requested ORO to supply raw data pertaining to metals and organic contamination of fish and sediments in Poplar Creek and adjacent segments of Clinch River. Copies of this report have been prepared for submission.

We have reservations about posting DOE property along EFPC used by fishermen. Fishing is not common in EFPC, mainly because fish are not plentiful. Chances that anyone could catch and eat enough fish from this creek to accumulate a concentration of mercury in blood to cause health problems are practically nil. Continued monitoring in conjunction with Y-12 Plant efforts to locate and decontaminate/isolate presently active sources of mercury entering those waters is necessary. This study should be completed in about nine months, at which time we will reconsider our reservations about posting DOE property. Eliminating active sources may allow nature to mitigate the situation (reduce mercury concentration in fish below the FDA action guide of 1 ug/g over time). In essence, we feel that posting is premature at this time.

"3. Consider the following action in light of mercury concentrations calculated for beef from cattle grazing along EFPC: measure the concentration of mercury in hair from cattle or horses grazing along EFPC."

Additional data could be helpful; however, the number of cattle and horses grazing along EFPC is quite small, and obtaining statistically sound data would be a prolonged project. There are no present plans or authorization to do this. As we continue to study this problem, we will reassess this recommendation. We will consult with you before procuring any samples.

"4.2.2 Further Monitoring

1. Evaluate both the analytical and total procedural accuracy of the Y-12 analytical method at mercury concentrations greater than 1.1 $\mu\text{g/g}$ using blind reference standards.
2. Evaluate further the historical mercury record contained in New Hope Pond sediments by
 - a. measuring mercury concentrations in sediments as a function of sediment load currently washing into New Hope Pond;
 - b. obtaining and analyzing additional sediment cores; and
 - c. establishing an absolute chronology of mercury deposition in the pond.
3. Monitor mercury concentration in sediments in EFPC every two years and in Bear Creek every five years.
4. Following the start of operations of the new West End Sewage Treatment Plant, monitor in EFPC
 - a. mercury concentration in fish,
 - b. abundance and size distribution of the dominant sport fish populations, and
 - c. sport fishing effort and catch."

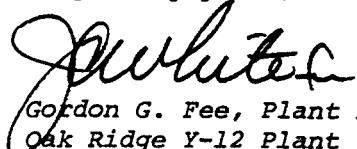
We concur with this recommendation for further monitoring and are planning for future monitoring activities after completion of the study presently under way.

This report has served to alert us to the fact that mercury contamination of the aquatic environment around the Y-12 Plant will likely be a problem for some time. We have not used mercury for approximately 16 years, but, obviously, this has not been sufficient time for the concentration of mercury in sediment to drop to normal background levels. We must continue to monitor the environment on a regular basis to assess our situation and detect trends. We must also determine conclusively if, and where, mercury from the Y-12 Plant is entering the creek. Our present programs should provide this information. We would appreciate receiving your comments on the conclusions and recommendations reached by the authors of this study, as well as your view of our response to them.

DOE, Mr. H. D. Hickman
Page 4
October 27, 1982

We note that the results of this study differ quite markedly from those reported in the "Environmental Impact Assessment, Oak Ridge Y-12 Plant," March, 1982, prepared by Battelle Memorial Institute for the Department of Energy, a preliminary copy of which we are currently reviewing. The statement is made on Page IV-3 of this report to the effect that, since known concentrations of mercury are below "recommended standards for deposit removal (25 ppm total mercury)," stream sediments may be left intact without hazard to the surrounding environs. This conclusion is not supported by the data in ORNL/CF-82/257. We think it is important to call this discrepancy to your attention for your further consideration.

Very truly yours,



Gordon G. Fee, Plant Manager
Oak Ridge Y-12 Plant

GGF:JCW:jm

cc: H. D. Hickman, DOE-ORO (2)
G. G. Fee
R. F. Hibbs
R. G. Jordan
L. J. Peacock - RC
C. R. Richmond
J. C. White
R. D. Williams <----->

Y/HG-0548

Y-12

A. Implementation of 1971 Recommendations

No recommendations were made during the 1971 appraisal.

B. Recommendations of the 1972 Appraisal

1. Evaluate alternate methods of meeting Tennessee air pollution emission limits from the steam plant. Assume that dependable flue gas cleanup systems will remain to be technologically infeasible for small, Y-12 size steam plants through early 1975 when a firm plan of action should be underway to meet the July 1, 1977, deadline.
2. Implement a plan by June 30, 1973, which will reasonably assure meeting the dissolved oxygen minimum limit of 5 ppm in East Fork Poplar Creek at the outfall of New Hope Pond.
3. Expand the investigative measures to the level necessary to promptly identify the sources of hexavalent chromium responsible for exceeding the fish and aquatic life limit of 0.05 ppm in East Fork Poplar Creek. The Y-12 data indicate that this concentration has been exceeded over 70% of the months in the past few years since this contaminant has been identified as a problem.
4. Identify and correct the sources of "slug" discharges of acids and bases into East Fork Poplar Creek which are responsible for exceeding the Tennessee limit of more than one pH unit change in 24 hours. In addition, the pH fluctuation data should be routinely included in the Air & Water Manual to give a more accurate picture of Y-12's compliance posture and to aid in alerting selected plant supervision to potential problems.
5. Cease disposing of waste oil in the burial ground "rat holes." Instead, utilize controlled surface disposal, probably in the burial ground, with Development Department coordination. Experimental surface disposal and associated biodegradation shows great promise. Although these experiments are not complete, they should be pursued aggressively and a larger scale field test appears to be desirable.

APPROVED FOR PUBLIC RELEASE	
P.L. McKinney Technical Information Office	9/22/85 Date

OAK RIDGE Y-12 PLANT INFORMATION CONTROL FORM

CR

DOCUMENT DESCRIPTION (Completed By Requesting Division)

Document No.	Author's Telephone No.	Accr. No.	Date of Request
MS 5-25-90 O	4-7593	2366-001	5/25/90

Unclassified Title:	1972 Environmental Appraisal: CRNL-Y-12-ORGOP	M-458
CRITIQUE OF DISCUSSION		

Author(s) UNIDENTIFIEDTYPE: Formal Report Informal Report Progress/Status Report Co-Op Report Thesis/Term Pa Oral Presentation (Identify meeting, sponsor, location, date): _____ Journal Article (Identify Journal): _____ Other (Specify): NOTES DATED 9/28/72Document will be published in proceedings No YesDocument will be distributed at meeting No YesDocument has patent or invention significance No Yes (Identify) _____Document has been previously released No Yes (Reference) _____

DIVISION REVIEW AND APPROVAL (Completed By Requesting Division)

TECHNICAL CLASSIFICATION REVIEW (Divisional Classification Representative)

Title(s): UNC Abstract: NADOCUMENT: Level Unc Category NA
R. M. McGehee Date 5/23/90
Signature _____

DOCUMENT REQUEST APPROVED (Division or Department)

Signature R. M. McGehee Date 5/23/90

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L.L. McCauley X _____

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DOCUMENT:

Level U Category _____

Weapons Data _____ Sigma _____

R. M. McGehee 5/31/90 Date

Y-12 Classification Office

Editor _____ Date _____
 Patent Office G. Keith 6-1- _____
 Other D. C. Wood 6-5- _____
D. C. Wood No legal reviewer _____
 Other _____ Date _____

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4/HG-0548

Author's Telephone No

6-0263

Acct. No

Date of Request

J. Classified Title

1972 Environmental Appraisal: ORNL - Y-12 - ORGOP

Critique of Discussion

M-458

S. Author Wiley ChemRisk Phase II

TYPE Formal Report Informal Report Progress/Status Report Co-Op Report Thesis/Term Paper Oral Presentation (Identify meeting, sponsor, location, date) _____ Journal Article (Identify Journal) _____ Other (Specify) _____Document will be published in proceedings No YesDocument will be distributed at meeting No YesDocument has patent or invention significance No Yes (Identify) _____Document has been previously released No Yes (Reference) 4/7/90 (MS-5-25-90 0)

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TECHNICAL CLASSIFICATION REVIEW (Divisional Classification Representative)

Title(s) Unclassified Abstract -

DOCUMENT REQUEST APPROVED (Division or Department)

DOCUMENT Level Unclassified Category -

Signature 9/14/95 Date

R.F. Craig

10/4/91 1995

Y-12 Classification Office

Date

Signature

Date

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9/15/95

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| <input checked="" type="checkbox"/> | Waived / P. McKenney | Date |
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CLASSIFICATIONS.

Title(s) U

Abstract NA

DOCUMENT:

Level

U

Category

-

Weapons Data

G.R. Fraser

Sigma

9/18/95
DateAPPROVED FOR: Declassification Release subject to use of the following admonitory markings and conditions: Disclaimer Copyright Patent Caution OtherP. R. McKenney
Technical Information Office9/22/95
Date

Conditions/Remarks



NUCLEAR DIVISION

INTERNAL CORRESPONDENCE

January 19, 1983

Distribution - See Below

Meeting Summary: Mercury Contamination

On Friday, January 7, 1983, a meeting was held in the 9106 building conference room on the above subject. The purpose of this meeting was to review progress of the Mercury Contamination Study underway, identify active sources of mercury contamination, and recommend clean-up actions for sources of mercury identified.

Data collected from the drain pipe survey completed in December was plotted on a map of the storm sewer system. From the data and visual observations during the survey, the following conclusions were drawn:

1. Major active sources:

9201-5	73.2 grams/day
9201-4	25.8 grams/day
9201-2	13.4 grams/day

2. Primary forms of release are suspended and sediment solids.

3. Settling occurs in the industrial ditch.

4. Settling occurs in New Hope Pond.

5. Many of the major drain lines with high mercury flux contained considerable debris and settled solids.

The fan rooms in 9201-5 were inspected and metallic mercury was observed, particularly on the west side. Previous inspections had identified other sources of mercury contamination that need to be cleaned.

Based on data and observations made, the following actions were recommended:

1. Clean mercury from fan rooms and sumps in and around 9201-5 and 9201-4.
2. Clean major storm sewers showing high mercury flux.
3. Clean up and decommission 81-10.
4. Inspect and clean mercury from 9201-2.

Distribution
Page 2
January 19, 1983

5. Dispose of sludges and sediments collected.
6. Investigate rerouting drain lines in 9201-5.
7. Install temporary dams in the industrial ditch to trap sediment solids resulting from clean-up activities. Remove trapped materials when completed.
8. This work be accomplished during the simultaneous shutdown by Metal Prep and Maintenance personnel.

The outcome of the meeting was an agreement to appoint a person from the Metal Preparation Division to coordinate planning and execution of the clean-up activities.

LJ Peacock

L. J. Peacock, 9106, MS-5 (4-2579)

LJP:GK:eh

Distribution:

H. C. Beeson, 9734, MS-1
T. H. Ebert, 9201-5, MS-4
G. E. Kamp, 9106, MS-5
D. A. Jennings, 9723-25, MS-1
G. B. Marrow, 9204-2, MS-2
J. M. Napier, 9202, MS-1
L. J. Peacock, 9106, MS-5
P. M. Pritz, 9106, MS-5
M. Sanders, 9106, MS-5
H. H. Stoner, 9106, MS-5
J. W. Strohecker, 9739, MS-3
R. E. Stubblefield, 9201-5, MS-4
R. R. Turner, 1505, Room 214, ORNL
~~W. C. Taggart~~, 9212, MS-2

cc: G. G. Fee, 9704-2, MS-14
J. C. White, 9704-2, MS-19
R. D. Williams, 9704-2, MS-15

**NUCLEAR DIVISION***INTERNAL CORRESPONDENCE*

March 4, 1983

Y/HG-0013/21

Distribution

Mercury Cleanup

Metal Preparation personnel held a meeting with plant representatives to discuss the mercury cleanup recommendations made by the Environmental Affairs Department. Attached is the summary of that meeting, the Action Plan, the Action Plan Summary and the Projected Cost Estimate.

W. J. Yaggi, 9212, MS-2

WJY:THE:sph

Enclosures

Distribution:

G. L. Bean, 9706-2, MS-2
H. C. Beeson, 9734, MS-1
C. R. Eichelberger, 9720-6, MS-1
D. A. Jennings, 9201-5, MS-7
G. E. Kamp, 9106, MS-5
G. B. Marrow, 9204-2, MS-2
J. M. Napier, 9202, MS-2
L. J. Peacock, 9106, MS-5
D. W. Smith, 9212, MS-2
R. E. Stubblefield, 9201-5, MS-4
F. V. Tilson, 9201-5, MS-4 ←
G. L. Ward, 9201-5, MS-4
W. J. Yaggi, 9212, MS-2
File - THE - NoRC

cc/enc: G. G. Fee, 9704-2, MS-15
H. M. Oakes/M. P. Ross, 9704-2, MS-6
J. C. White, 9704-2, MS-19
R. D. Williams, 9704-2, MS-14

APPROVED FOR PUBLIC RELEASE	
	8/3/84
Technical Information Office Date	

February 25, 1983

Meeting Summary: Mercury Contamination

On Thursday, February 17, 1983 a meeting was held in Alpha-5 for the purpose of reviewing and getting a better understanding of the effort required by Maintenance and Metal Preparation personnel to satisfy the mercury cleanup recommendations made by the Environmental Affairs Department. This definition and understanding was necessary in order to estimate labor and material requirements that were requested by the Accounting Department before opening an account to collect costs associated with this mercury cleanup effort.

An Action Plan was established with assigned responsibilities and projected completion dates. The Y-12 Plant goal is to reduce the level of mercury entering New Hope Pond.

Attached is the Action Plan, Action Plan Summary and projected cost estimate. The account number to be used for Maintenance and Metal Preparation charges will be furnished as soon as it has been established by the Accounting Department. The Y-12 Plant Coordinator for this activity is G. L. Ward, 4-2078.



T. H. Ebert, 9201-5, MS-4

Y-12 Plant Mercury Cleanup Action Plan

<u>Action</u>	<u>Responsibility</u>	<u>Completion Date</u>
1. Install a series of temporary dams in the Industrial Ditch leading to New Hope Pond.	C. R. Eichelberger (Maintenance) G. E. Kamp (Environmental) J. M. Napier (Development)	April 4, 1983
2. Remove any sludge accumulated in the Industrial Ditch.	C. R. Eichelberger (Maintenance) G. E. Kamp (Environmental)	April 11, 1983
3. Remove sludge from 81-10 and clean concrete pad and flush drains.	G. L. Ward (Metal Prep)	April 11, 1983
4. Seal gravel area where mercury sludge was stored at 81-10 with black-topping.	C. R. Eichelberger (Maintenance)	April 18, 1983
5. Clean mercury from fan rooms in Building 9201-5.	G. L. Ward (Metal Prep)	April 18, 1983
6. Clean mercury from fan rooms in Building 9201-4.	G. L. Ward (Metal Prep)	April 25, 1983
7. Inspect and clean mercury as necessary from Building 9201-2.	G. L. Ward (Metal Prep)	May 2, 1983
8. Cover the entrances to sump tanks behind Buildings 9201-4 and 9201-5	G. L. Ward (Metal Prep)	May 2, 1983
9. Inspect and remove any visible mercury from storm sewer piping and manholes around Buildings 9201-4 and 9201-5.	G. L. Ward (Metal Prep)	May 16, 1983
10. Remove sludge and dams from Industrial Ditch.	C. R. Eichelberger (Maintenance) G. E. Kamp (Environmental)	June 20, 1983
11. Prepare sludge for sale.	G. L. Ward (Metal Prep)	July 1, 1983
12. Investigate mercury trapping devices at exit of Building Discharge.	G. B. Marrow (Waste Management)	July 1, 1983
13. Evaluate effectiveness of cleanup via stream sampling as required.	G. E. Kamp (Environmental)	July 11, 1983

Action Plan Summary

1. A series of temporary dams consisting of sand-filled nylon bags will be installed at strategic locations within the Industrial Ditch. These will act as barriers for settling out suspended particulate matter containing mercury that will become mobilized during the cleanup operations.
2. Sludge that has accumulated above existing barriers in the Industrial Ditch will be dredged out and disposed of properly. Trapped sludge and debris will be removed from the main storm sewer lines.
3. The drums of sludge accumulated at the 81-10 area will be re-packaged in new drums with double plastic bag linings and taken to Building 9201-4. The immediate area of this drum storage area will be excavated two to three inches deep with the material being removed treated as mercury contaminated sludge. The concrete pad under the obsolete processing equipment will be cleaned and the drains to this area will be flushed.
4. The sludge storage area at 81-10 will be covered with a layer of bituminous surface material (asphalt). This action will prevent rain transport of residual mercury to the Industrial Ditch.
5. The fan rooms as well as other potential mercury areas of Building 9201-5 will be inspected for visible evidence of mercury. All mercury found will be vacuumed up and disposed of properly. The sludge in the sumps from the building floor drains will be pumped out into drums and processed as sludge.

6. The fan rooms as well as other potential mercury areas of Building 9201-4 will be inspected for visible evidence of mercury. All mercury found will be vacuumed up and disposed of properly. The sludge in the sumps from the building drains will be pumped out into drums and processed as sludge.
7. Potential areas of mercury in Building 9201-2 will be inspected for visible evidence of mercury. All mercury found will be vacuumed up and disposed of properly.
8. All openings on the obsolete sump tanks south of Buildings 9201-4 and 9201-5 will be covered and all existing covers will be secured to prevent entry of rain water. This will be accomplished using local 9201-5 Maintenance personnel.
9. Storm sewers surrounding Buildings 9201-4 and 9201-5 will be inspected and visible mercury will be removed. Personnel entry into manholes will be limited and only with fresh air equipment and other applicable safety equipment and procedures.
10. Removed sludge accumulated in the Industrial Ditch at the dams during the cleanup as well as removal of the dams starting upstream and working downstream.
11. The sludges that will have been accumulated from this cleanup and other stored mercury sludges will be prepared for sale at Building 9201-4. The material will be double bagged with plastic in good, sealable drums, volume measured, and weighed. Arrangements will be made with Purchasing for sale of this material.

Budget Estimate for Mercury Cleanup

Metal Preparation

Staff and Supervisory Support (660 hours @ \$16.00/hour)	=	\$ 10,560
Labor (3 operators for 14 weeks, 1680 mh @ \$75.00/hour)	=	126,000
Sludge analytical costs (100 samples @ \$125.00/sample)	=	12,500
Materials (Drums, bags, etc.)	=	<u>3,200</u>
		Total Metal Preparation Costs
		\$ 152,260

Maintenance

Labor (300 mh @ \$29.00/hour)	=	8,700
Materials (Sand, bags, asphalt)	=	<u>2,000</u>
		Total Maintenance Costs
		10,700

Total of All Projected Costs 162,960

Add 10% Contingency 16,296

Grand Total of All Costs \$ 179,256

Budget Estimate for Mercury Cleanup

Metal Preparation

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		Total Maintenance Costs
		10,700

Total of All Projected Costs	162,960
Add 10% Contingency	<u>16,296</u>

Grand Total of All Costs	\$ 179,256
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REC'D **NUCLEAR DIVISION** *REC'D* **ccy: R. D. Williams/FVT, 5-11-83**

May 9, 1983

W. J. Yaggi, 9212, MS-2

Mercury Cleanup

The mercury cleanup operation outlined in your letter of March 4, 1983 is being carried out and showing progress. Enclosed is a status of completed work and remaining activities through May 6, 1983. Completion of the mercury cleanup campaign is projected for July 1, 1983, at which time all available sludge will be listed and ready for sale.

G. L. Ward

G. L. Ward, 9201-5, MS-4 (4-2078)

GLW:sph

Enclosure

cc/enc: G. L. Bean, 9706-2, MS-2
H. C. Beeson, 9734, MS-1
T. H. Ebert, 9201-5, MS-4
C. R. Eichelberger, 9720-6, MS-1
D. A. Jennings, 9201-5, MS-7
G. E. Kamp, 9106, MS-5
G. B. Marrow, 9204-2, MS-2
J. M. Napier, 9202, MS-2
L. M. Peacock, 9106, MS-5
D. W. Smith, 9212, MS-2
R. E. Stubblefield, 9201-5, MS-4
F. V. Tilson, 9201-5, MS-4 ←
File - GLW - NoRC

*5/11/83
S. L. Williams*

Mercury Cleanup Status Report as of May 6, 1983

1. A total of three sandbag dams were installed in the Industrial Ditch. A settling basin was dug ahead of each dam for sediment collection.
2. The old drums of sludge at the 81-10 area were re-drummed in new plastic-lined drums. The area where these old drums were sitting was excavated and then paved over with asphalt. The sediment on the concrete pad under the obsolete mercury sludge processing area was removed and drummed. The concrete pad and its drains were washed down. The settling basin to the drains of this area was drained and cleaned. The sludge from this cleaning operation was drummed. All sludges accumulated from the 81-10 area were moved to Building 9201-4 for preparation for sale.
3. All visible mercury has been removed from the 9201-5 fan rooms. Three of the fan room sump tanks have been cleaned.
4. All visible mercury has been cleaned from Building 9201-4 in the old processing areas above the fan room level.
5. The covering of the entrances to the sump tanks behind Buildings 9201-4 and 9201-5 is approximately half complete.

Remaining Items

1. Cleanup of five fan room sumps in Building 9201-5.
2. Cleanup of the fan rooms and fan room sumps in Building 9201-4.
3. The inspection and cleanup of Building 9201-2.
4. Approximately half of the job to cover the sump tanks behind Buildings 9201-4 and 9201-5. (Maintenance)
5. The removal of visible mercury in the storm sewer drains around Buildings 9201-4 and 9201-5.
6. Removal of the sludge and dams in the Industrial Ditch after completion of the work at 9201-4 and 9201-5. (Maintenance)
7. Preparation of the sludge for sale.

U.S. DEPARTMENT OF ENERGY
P. O. BOX 'E'
OAK RIDGE, TN 37830

DOE NEWS:

FOR IMMEDIATE RELEASE
MAY 17, 1983

DOE RELEASES REPORT ON HISTORICAL RELEASES
OF MERCURY FROM OAK RIDGE Y-12 PLANT

OAK RIDGE, TN -- The Department of Energy's (DOE) Oak Ridge Operation today released statistical information on quantities of elemental mercury that are unaccounted for or have been lost, primarily during the 1950's, from a former processing activity at DOE's Oak Ridge Y-12 Plant.

The information, released to the Tennessee Department of Public Health, the Environmental Protection Agency (EPA), officials of the City of Oak Ridge and Roane and Anderson counties, is contained in a report recently declassified by DOE.

The report, dated June, 1977, estimates that 2.4 million pounds of mercury was lost in releases to the ground, water and air or is unaccounted for. The mercury was used in a large-scale lithium separation process at the Y-12 Plant between 1950 and 1963 in connection with the nuclear weapons program. The process has not been used since that time.

In recent years residual mercury losses to the environment have been minimal due to clean-up activities and environmental protection measures that have been taken.

DOE indicated that the composite 2.4 million pound figure contained in the 1977 report may be adjusted slightly as a result of an ongoing audit of the report's statistical information to determine, as best as possible, the accuracy of the historical information, some of which is based on recollection of plant personnel.

DOE has advised officials of the governmental entities that the concentrations of mercury found in recent years in water and sediment in East Fork Poplar Creek, which flows through the plant site into the Oak Ridge community, pose no hazard to area residents. The State posted the creek in November of 1982 as a protective measure, based on information DOE furnished that showed mercury concentrations in some fish caught in the upper regions of the creek exceeded current Food and Drug Administration guidelines.

DOE's assessment of the potential hazards of mercury concentrations is based on data obtained from its environmental monitoring program, the results of which have been reviewed, not only by environmental and toxicological specialists in DOE programs, but by an outside authority as well. In addition, DOE is continuing to gather, test and evaluate information regarding mercury in the creek.

(more)

DOE will participate with the State and EPA in a cooperative study of potential environmental problems associated with the historical releases of mercury from the Y-12 Plant.

The 1977 report states that of the 2.4 million pounds of mercury lost or unaccounted for at Y-12, the majority of the material, estimated at 1.9 million pounds, was likely lost in processing losses or spills that flowed into and are believed trapped within geologic formations on the plant site. Approximately 30,000 pounds is calculated to have been discharged to the atmosphere.

The report shows that a total of 475,000 pounds of mercury is believed to have moved by process drainage systems and surface movement to East Fork Poplar Creek, primarily during the late 1950's, when a mercury-bearing nitric acid solution from a purification process was discharged to the creek.

Current losses of residual mercury from the Y-12 site to the creek are estimated at two ounces per day in a flow rate of between six and eight million gallons of water per day.

After flowing for approximately 20 miles the creek empties into the Clinch River in the western portion of Oak Ridge. The mercury discharged to East Fork is believed to have deposited into sediment along the full length of the creek bed or into the Clinch River.

One of the concerns to be addressed in the cooperative DOE-State-EPA study is the possibility that residents of the Oak Ridge area may have taken stockpiled sediment from City dredging operations at points along the East Fork Poplar Creek and used the sediment as fill or in gardens. The City has recently advised DOE that it has no evidence that any of the stockpiled material was actually removed.

DOE indicated that current scientific data indicates minimal uptake of mercury from soil into vegetables; however, the Department is performing additional mercury uptake studies, the results of which will be shared with the State, EPA and the City.

DOE said the accuracy of the historic figures contained in the 1977 report was difficult to determine since the mercury upon receipt at the plant was not precisely inventoried. DOE personnel are currently reviewing all available data and interviewing plant personnel to determine to the extent possible the accuracy of the estimated figures.

- DOE -

News Media Contact: Wayne Range, (615) 576-0885

R-83-77

DOCUMENT DESCRIPTION (Completed By Requesting Division)

Document No. <u>YMS/CTR2-0143</u>	Author's Telephone No. <u>6-0263</u>	Acct. No. <u>2366000 3</u>	Date of Request <u>5/22/95</u>
Unclassified Title: <u>INTERNAL CORRESPONDENCE FOLDER (M-221)</u> <u>DOE 5-83 Press Release, 10-82 Feet to Hickman Letter, 1983 Hg Clean-Up Status,</u> <u>1977 Bottle Beverage Memo</u>			
Inor(s) Requestor: Steve Wiley			

TYPE: Formal Report Informal Report Progress/Status Report Co-Op Report Thesis/Term Paper

Oral Presentation (Identify meeting, sponsor, location, date): _____

Journal Article (Identify Journal): _____

Other (Specify): To Be Released to ChemRisk, Phase II

Document will be published in proceedings No Yes

Document will be distributed at meeting No Yes

Document has patent or invention significance No Yes (Identify) _____

Document has been previously released No Yes (Reference) _____

DIVISION REVIEW AND APPROVAL (Completed By Requesting Division)

TECHNICAL CLASSIFICATION REVIEW (Divisional Classification Representative)

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DOCUMENT: Level U Category N.A.

J.R. Roseman
Signature

5-23-95
Date

DOCUMENT REQUEST APPROVED (Division or Department)

R.D. Drury
Signature 5/22/95 Date

Signature _____ Date _____

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(Name and title)

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R. D. Williams
R. D. Williams

YTS-1630

Earl, Pete, Jack

this will probably
MARTIN MARIETTA ENERGY SYSTEMS, INC.

November 26, 1984

Nov 27 235 PM '84

SEC:

B. A. Kelly
 H. A. Nelms
 W. D. Simpson

Reduction of Mercury in Plant Effluents

This memo is a confirmation of the approach and priorities that we are taking to fulfill the purpose of this project — Reduction of Mercury in Plant Effluents. Since the mercury in East Fork Poplar Creek comes from many non-process sources, it is recognized that elimination of all mercury discharges is not practical and may not be possible. The goal of this project is to reduce these discharges as much as practical within the fiscal and operating constraints of this project.

Many of the sources of mercury are known and will not be reviewed in detail; however, the exact release mechanisms in many cases need better definition. The major mercury sources that need to be addressed in the priority shown are:

1. Mercury and mercury-contaminated sediments in the storm sewer system located in the "mercury use area" that incorporates Buildings 9204-4, 9201-5, and 9201-4.
2. Mercury leaving 9204-4 and entering the storm sewer system.
3. Mercury leaving 9201-5 (and 9201-4 if there are significant delays in the Alpha 4 stripping project) and entering the storm sewer system.
4. Mercury contamination of soils around leaking storm sewer lines.

Other sources of mercury that need to be addressed, but may lie outside the fiscal scope of this project, include: rain water entering 9204-4, 9201-5, and 9201-4 through leaking roofs; groundwater seepage into mercury-contaminated fan rooms and basements; and mercury-contaminated soils within the plant.

The general approach agreed upon to fulfill the purpose of this project is as follows:

1. Remove mercury and mercury-contaminated sediments that can be readily carried into EFPC to the extent practical.
2. Isolate other sources of mercury contamination (not readily removable) that could enter the storm drain system to the extent practical.
3. Collect and treat residual mercury-contaminated water sources after the above two approaches are complete.

Removal

Removing of mercury and mercury-contaminated sediments involves inspecting the storm sewer system in the mercury use areas in order to upgrade our information on location and quantity of sources, develop plans for removal while minimizing downstream transport of the disturbed materials, identify connections to the storm sewer system that may not have been previously identified, and to develop plans for isolating the storm sewer system from the groundwater table and the mercury-contaminated soils that lie outside these pipes. Ideally, this should be done by an experienced contractor if working in the Exclusion Area does not present a problem for plant security. If it does, other approaches will need to be addressed. Sediment removal needs to be accomplished in a manner to minimize downstream transport of this material as well as disruption to plant operations. These sediments are also contaminated with uranium, and at minimum need to be considered as a low-level radioactive waste. Selected samples have passed the EP toxicity test; however, final determination of whether this is a co-contaminated waste has yet to be made. It should be noted that these materials contain many of the same components as New Hope Pond sediments and these materials settle in New Hope Pond. Disposal of these materials along with New Hope Pond sediments may simplify the waste disposal aspect of this project. This should be investigated with the State and EPA.

Isolation

Isolation of mercury sources involves several different approaches depending on the source, its release mechanism, and relative contribution to the mercury contamination of EFPC. Within Buildings 9204-4, 9201-5, and 9201-4, an essential isolation approach is to reroute clean waters (once through clean cooling waters, steam condensate, air conditioning condensate, etc.) from mercury-contaminated pits and piping into "clean conduits" to Upper East Fork Poplar Creek. These clean conduits may be existing storm sewer lines that have been cleaned and rehabilitated. This should significantly reduce the possibility of clean waters getting contaminated with mercury as well as allow for possible isolation of mercury-contaminated piping. It should also significantly reduce the amount of remaining mercury-contaminated waters that may require treatment.

In many places within the mercury use areas, the storm sewer system lies below the water table; and during high groundwater periods, it is suspected that mercury is reintroduced into the storm sewer system. The storm sewer system was installed when the plant was built; and in many places within the mercury use areas, the integrity of the system is breached, thus allowing for direct coupling with groundwater. In the few places where the storm sewer is intact, puddles of mercury can be found in bell joints. Small amounts of mercury can be observed around bell joints whose integrity has been breached, thus

indicating that the soil outside these joints is probably mercury contaminated. (Excavation would be required for direct verification.) Rehabilitation of other storm sewers that are not part of the clean conduit system in the area around 9204-4, 9201-5, and 9201-4 need to be seriously considered in this approach.

Other isolation approaches within Buildings 9201-5, 9201-4, and possibly 9204-4 could involve permanently sealing former process piping and equipments as well as selective diking around equipments and sumps in order to catch and retain mercury. Trapped materials could be removed on a regular basis. Another approach to be considered is decontamination (cleaning) and sealing the mercury within the building structures. These approaches require further technical evaluation to determine desirability, feasibility, as well as whether these should be accomplished on this project or on expense funds.

The roofs of Buildings 9204-4, 9201-5, 9201-4, and 9201-2 have been inspected under FY 1984 expense funds and recommendations for repair have been made. Repair of roofs is not part of this project; however, the recommendation for repair should be forwarded to appropriate plant maintenance and operating personnel with encouragement to include these repairs in their operating budget. Where the down drains in these buildings enter mercury-contaminated piping (or areas such as fan room sumps), this project should investigate rerouting these down drains into the clean conduits.

Groundwater seepage into 9201-4 creates a problem because it enters mercury-contaminated sumps in the fan rooms and thus may ultimately require collection and treatment. Groundwater intrusion into 9201-5 and 9204-4 is suspected but not verified. Under FY 1985 expense funds, a study to determine the feasibility and practicality of passively lowering the groundwater table in the vicinity of these buildings is planned. The outcome of this study could have an impact on the isolation portion of this program if a french drain system appears practical and could significantly reduce mercury in EFPC.

Isolation of soils in the mercury use areas to prevent surface runoff from carrying contaminated soils into the storm sewer system should be investigated and the potential benefits of such actions evaluated. However, if this isolation approach is of low priority within the project, recommendations to accomplish this under expense funds should be made to appropriate plant maintenance and operating personnel.

Finally, if other isolation approaches are identified, they should be investigated and recommendations made according to the findings.

Treatment

The Y-12 Development Division should proceed with their treatability and pilot process studies that are presently underway under separate funding. The project team needs to maintain close contact with their work because after the mercury removal and isolation approaches have been completed, there may be residual mercury-contaminated water sources that will require collection and treatment.

At this point in the project, it is impossible to make reasonable estimates on the quantity and level of contamination of these waters so that project funds can be set aside for treatment. Since funding will come over three years, we will need to address treatment in FY 1986 and FY 1987 depending upon the success of the removal and isolation efforts of this project in lowering the amount of mercury leaving the plant in EFPC.

FY 1985 Priorities

For fiscal year 1985, we need to direct our efforts toward (1) removing the mercury-contaminated sediments in the storm sewer system because these materials are most readily releasable into EFPC; (2) concentrate our isolation efforts first in the area of 9204-4 because this building is the largest contributor to the mercury in EFPC; (3) develop clean conduits for Buildings 9201-5 and 9201-4 (isolation efforts on these buildings will probably be accomplished over the following two years); and (4) technically define, evaluate, and prioritize the other approaches identified so that remaining project funds can be utilized for subprojects that have the best potential for fulfilling the purpose of this project.

It is recognized that all potential actions to reduce mercury released to EFPC cannot be accomplished within funding available. Therefore, it is essential that we spend project funds on actions that we believe will have the greatest impact on fulfilling the purpose of this project — Reducing

B. A. Kelly et al.

Page 5

November 26, 1984

Mercury in Plant Effluents. Other "remedial type" actions of lower priority that could be beneficial and funded by separate sources should be identified and appropriate recommendations made.


G. E. Kamp, 9704-1, MS-001, Y-12 (6-5971) - NoRC

GEK:sr

cc: H. L. Bailey
J. K. Bailey
H. C. Beeson
W. G. Butturini
T. R. Butz
R. M. Canon
R. J. Clouse
K. E. Cowser
R. L. Dagley
R. O. Daugherty
S. P. duMont III
D. J. Elliott
G. W. Evans
G. G. Fee
R. W. Glass
M. L. Jones
W. E. Manrod III
J. M. Mills, Jr.
M. E. Mitchell
J. M. Napier
J. A. Parsons
E. G. St. Clair
J. L. Snyder
M. J. Stephenson
L. H. Stinton
R. R. Turner
W. E. Weathersby
J. C. White
W. J. Wilcox, Jr.
R. D. Williams
W. J. Yaggi

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Cy: LLong
MEM 5/21/87

Internal Correspondence

MARTIN MARIETTA ENERGY SYSTEMS, INC.

May 21 | 55 PM '87

May 21, 1987

J. K. Bailey
 T. R. Butz
 C. P. East
 C. C. Hill
 C. W. Kimbrough

L. L. McCauley
 L. J. Mezga
 M. E. Mitchell
 T. P. A. Perry
 H. D. Whitehead, Jr.

Responses to Findings of the Department of Energy (DOE) Headquarters Environmental Survey

Attached is a draft copy of the compiled responses to the findings from the DOE Headquarters Environmental Survey. Please review the information provided to assure the validity of the facts and that the subjective content has been kept at a minimum. There are a few findings for which additional response-related information is still being compiled, however, in the interest of time, this document is being distributed without such input. The responses and additional comments or corrections will be discussed in the meeting scheduled for Friday, May 22, 1987, in Building 9704-1 Conference Room at 1:00 p.m. The responses will then be presented to DOE - Oak Ridge Operations on May 27, 1987, in Building 9711-1 Conference Room, at 8:30 a.m., in preparation for a meeting with the Tennessee Department of Health and Environment.

Let me know if you have any questions.

Stephanie Marcus, 9704-1, MS-1, Y-12 (6-8120) - NoRC

SM:lap

Attachment: As Stated

cc/att: M. L. Jones
 L. O. Vaughan
 File - SM

This document has been reviewed for classification and has been determined to be UNCLASSIFIED

ADC Signature

5/10/95
 Date

APPROVED FOR PUBLIC RELEASE

P. L. McKenney	5/24/95
Technical Information Office Date	

1. coolant mixed with halogenated degreasing solvents is hazardous;

2. mopwaters containing trace amounts of degreasing solvents from incidental drippings are not hazardous.

Presently an effort is underway to determine whether or not residual liquids accompanying the uranium chips during treatment or disposal are RCRA hazardous. It can be argued that the residual liquids are not hazardous due to the incidental, trace amount of solvent present and the existence of plant procedures governing freon application/use.

If the residual liquids are determined to be RCRA hazardous waste then the chips would have to be handled as a hazardous waste. Revised RCRA Part A permit applications and RCRA Part B permit applications would have to be submitted for the UCOF and BCV Disposal area after June 1, 1987.

Finding #3

A backflow preventer at Building 9201-3 was found unsatisfactory on every 6 month inspection since June 1981. Delay in repairing defective backflow preventers could allow potentially hazardous process waters to contaminate the potable water system.

Comment: Shortly after the close-out meeting, the backflow preventer noted in this finding was replaced. Corrective action completed.

CATEGORY III

Finding #4

Mercury contaminated groundwater within the plant site is entering the surface water of East Fork Poplar Creek (EFPC) through outfalls which are not currently monitored. Additionally, there is a potential for uranium, nitrates, solvents, copper, iron and sulfate contaminants on-site to be transported to the surface water through the groundwater. Polychlorinated biphenyl (PCB) contamination on-site also may be entering the groundwater but transport into EFPC is more likely through surface runoff.

Comment: The evidence for mercury contamination of groundwater at the Y-12 Plant is minimal. As noted by Rothschild, et al. (ORNL/TM-9029), some high concentrations of mercury do occur in soil and fill at several areas within the plant but, mercury analyses of groundwater indicate that mercury does not appear to

be moving in significant quantities in an aqueous phase: The highest soluble concentrations found (about 1 ug/l) were limited to three wells. The occurrence of elevated mercury levels, mainly in shallow soils and fill (less than 10 feet) and the background concentrations of mercury observed in most of the wells indicates that the metal has been generally immobilized/retained in upper earth materials. It is true that groundwater which enters the subsurface storm drainage system via sumps and pipe infiltration can become contaminated with mercury before reaching EFPC. The presence of metallic mercury and mercury-contaminated sediment in many storm drains, in concert with chlorinated raw water (once-through cooling water) can lead to significant export of both soluble and particulate mercury to EFPC. Efforts underway to alleviate this situation include the cleaning and relining of pipes and the rerouting of water flow. These activities are part of the Reduction of Mercury in Plant Effluents Line Item project.

With respect to uranium, nitrate and heavy metal contamination: It is known that the plume of the S-3 Ponds extends toward the east and contains uranium, nitrate and heavy metals. The potential exists for these materials to enter the surface water through springs and also infiltration into storm sewers. The extent and movement of this and plumes potentially generated by other sites is being addressed by the Comprehensive Groundwater Study Plan for the Y-12 Area which is currently being prepared by a subcontractor.

With respect to PCB contamination: As acknowledged by the survey team comment, the possibility of PCB transport in groundwater to EFPC is remote because of the high affinity of this contaminant for surfaces. The issue of whether active surface water transport of PCBs into EFPC is currently being addressed by several programs including state of the art biological monitoring techniques and conventional water quality monitoring. Soil sampling is scheduled for key locations around the Z-oil process buildings, tanks and pipelines to identify potential areas with PCB contamination. Until this sampling effort is complete, it cannot be determined whether or not the Z-oil system is a source of PCB contamination to EFPC.

The Area Source Pollution Assessment and Control Plan for EFPC is currently evaluating some of the issues raised by this finding. This study is using the assistance of an engineering contractor, and its objective is to evaluate nonpoint source discharges to EFPC. Nonpoint source discharges include surface water runoff and groundwater infiltration which discharge into EFPC. The program is looking at all pollutants which may be entering EFPC as a result of nonpoint pollution sources. Pollutants being evaluated include: all the nutrients such as nitrates, phosphates, and ammonia; heavy metals such as copper, zinc, mercury, uranium,

ambient air quality of the surrounding area. A hydrogen fluoride scrubber has been installed at Building 9206 and is scheduled for startup early this year. Additional scrubbers are under construction at Building 9212.

Comment: Although the start up of the Building 9206 scrubber has been postponed, it has not been shown that releases of HF from the Y-12 Plant have had an adverse impact on ambient air quality of the surrounding area. Results of ambient air sampling conducted within and around the Y-12 Plant by the Environmental Monitoring Group have consistently shown that ambient HF levels are well within the EPA ambient air quality standards.

Finding #15

The holding capacity of New Hope Pond has been reduced by the accumulation of large volumes of sediment over time and now may not provide sufficient containment for a large spill of hazardous material. The shorter retention time may also decrease its effectiveness as a sedimentation basin, resulting in release of heavy metals, such as mercury, into East Fork Poplar Creek. Y-12 has proposed dredging of New Hope Pond but is presently awaiting resolution of regulatory differences of opinion between the State of Tennessee and EPA Region IV regarding disposition of the dredged material.

Comment: A meeting was held with the State and the EPA on April 9, 1987, to discuss alternatives for New Hope Pond. Samples taken by the Y-12 Plant show that the sediment passes the EP Toxicity test. The EPA and the TDHE are reviewing the information presented, and indications are that a joint decision will be made concerning the disposition of the sludge and future status of New Hope Pond.

Finding #16

The use of fuel-oil ignition on Boilers #3 and 4 will continue to require baghouse bypass resulting in opacity and mass emission limitation exceedances, which can cause or contribute to exceedances of the 24 hour primary health based total suspended particulate standard. These boilers are scheduled for conversion to natural gas ignition during the summer of 1988.

Comment: Boilers 1 and 2 were converted to natural gas ignition (No. 2 started on natural gas on November 12, 1986 and No. 1 started on natural gas on January 19, 1987). Excess opacity due to hot standby firings have been reduced to below the 1% operating

Finding #27

The required number of bacteriological samples are not being run on the Y-12 water distribution system, and the analysis records are not being retained for the required length of time.

Finding #28

~~Cooling water discharges to EPPG exceed the NPDES upper pH limit of 8.5 due to the natural alkalinity in the makeup water and the corrosion inhibitor being used. Tests on reformulating the corrosion inhibitor to meet the required pH and at the same time meet toxicity criteria have been undertaken and, to date, appear to be successful.~~

Finding #29

While the State has permitted the disposal of asbestos materials at the sanitary landfill, uranium contaminated asbestos materials are being disposed of at the Bear Creek Valley Waste Disposal Area without State notification or approval.

Comment: Even though State permits and approvals are not required for disposals in Bear Creek Burial Ground, the operation of the facility is patterned after operating requirements from the State Solid Waste Management regulations to ensure proper disposal. Contaminated asbestos is disposed in special waste cells under conditions which meet TDHE requirements. A record of all asbestos disposals in the Bear Creek Burial Ground are submitted to the DOE monthly for transmittal to the TDHE.

Finding #30

The trash radiation monitor operation does not have sufficient quality assurance controls to verify that the analyses used to determine if the trash is contaminated or not are reliable.

Comment: Quality control charts have been developed and are used on a weekly basis to ensure the reliability of the detector crystals, pm tubes and associated electronics at the trash monitoring station.

Finding #31

An open drain valve was discovered on a spill containment structure for a PCB transformer located outside on the south side of Building 9201-5N. Leaving drain valves open on such structures defeats the purpose of providing secondary containment.

DOCUMENT DESCRIPTION (Completed By Requesting Division)

Document No. <u>NTS/ChRQ-042</u>	Author's Telephone No. <u>6-0263</u>	Acct. No. <u>2366000 3</u>	Date of Request <u>5/19/95</u>
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Unclassified Title: RESPONSES TO FINDINGS OF THE DEPARTMENT OF ENERGY (DOE) HEADQUARTERS ENVIRONMENTAL SURVEY - MEMO

Author(s) Requestor: Steve Wiley (copy marked pages) → Task 7 then Jennifer L.

TYPE: Formal Report Informal Report Progress/Status Report Co-Op Report Thesis/Term Paper

Oral Presentation (Identify meeting, sponsor, location, date): _____

Journal Article (Identify Journal): _____

Other (Specify): To Be Released to ChemRisk, Phase II

Document will be published in proceedings No Yes

Document will be distributed at meeting No Yes

Document has patent or invention significance No Yes (Identify) _____

Document has been previously released No Yes (Reference) _____

DIVISION REVIEW AND APPROVAL (Completed By Requesting Division)

TECHNICAL CLASSIFICATION REVIEW (Divisional Classification Representative)		DOCUMENT REQUEST APPROVED (Division or Department)	
Title(s): <u>U</u>	Abstract: <u>N.A.</u>	<u>M.D. Wiley</u>	<u>5/19/95</u>
DOCUMENT: Level <u>U</u>	Category <u>N.A.</u>	<u>Signature</u>	<u>Date</u>
<u>J. D. Dickhauer</u>	<u>5-23-95</u>	<u>Signature</u>	<u>Date</u>

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<u>J. D. Dickhauer</u>	<u>5-23-95</u>	
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ChemRisk/Shonka Research Associates, Inc., Document Request Form

(This section to be completed by subcontractor requesting document)

Susan Flack / CEP
Requestor Document Center (is requested to provide the following document)

Date of request 3/17/95 Expected receipt of document 3/31/95

Document number no # Date of document 6/10/83

Title and author (if document is unnumbered)

Special Request for Mercury Documents by G.G.Fee
Letter - if attachment can be found please copy that also

(This section to be completed by Document Center)

Date request received 6/19/95

Date submitted to ^{y-12} ADC 6/20/95

Date submitted to ^{y-12} HSA Coordinator 6/20/95

(This section to be completed by HSA Coordinator)

Date submitted to CICO (y-12) 6/20/95

Date received from CICO (y-12) 6/23/95

Date submitted to ChemRisk/Shonka and DOE 6/28/95

(This section to be completed by ChemRisk/Shonka Research Associates, Inc.)

Date document received _____

Signature _____

Document No.

Y/T.S-1356

Author's Telephone No.

6-0263

Acct. No.

2366000 3

Date of Request

6/20/95

Unclassified Title: SPECIAL REQUEST FOR MERCURY DOCUMENTS
(CORRESPONDENCE)

Author(s) Requestor: Steve Wiley

TYPE: Formal Report Informal Report Progress/Status Report Co-Op Report Thesis/Term Paper Oral Presentation (Identify meeting, sponsor, location, date): _____ Journal Article (Identify Journal): _____ Other (Specify): To Be Released to ChemRisk, Phase IIDocument will be published in proceedings No YesDocument will be distributed at meeting No YesDocument has patent or invention significance No Yes (Identify) _____Document has been previously released No Yes (Reference) _____

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Title(s): U Abstract: -

DOCUMENT Level: U Category: -

Signature: J.D. McKinney Date: 6-23-95

DOCUMENT REQUEST APPROVED (Division or Department)

Signature: J.D. McKinney Date: 6/20/95

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Title(s): U Abstract: -

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Level: U Category: -

Weapons Data: Sigma: -

S.T. Boyer 6/21/95
Y-12 Classification Office Date Editor Date Waived /P. McKinney Date _____ Date _____ DateAPPROVED FOR: Declassification Release subject to use of the following admonitory markings and conditions: Disclaimer Copyright Patent Caution OtherSignature: A.W. Wiley Date: 6/23/95
Technical Information Office

Conditions/Remarks: A.W. Wiley



UNION CARBIDE CORPORATION
 NUCLEAR DIVISION
 P. O. BOX Y OAK RIDGE, TENNESSEE 37830

June 10, 1983

Department of Energy
 Oak Ridge Operations
 Attention: Mr. H. D. Hickman
 Post Office Box E
 Oak Ridge, Tennessee 37830

Gentlemen:

Special Request for Mercury Documents

Per the verbal request of J. F. Wing, DOE-ORO, two documents previously submitted to DOE in October 1982 in response to a Freedom of Information (FOI) Act request are transmitted. According to Mr. Wing, the first ten of the original fifteen items submitted (see Attachment 1) cannot be identified at ORO. Record copies of the information transmitted by UCC-ND have not been located and possibly were never made.

Our staff has reviewed files at ORO and, to the best of our knowledge, identified eight of the ten items, and that identification has been provided to the Environmental Protection Branch. Enclosure #1: Mercury in Fish 1976, Melton Hill Lake, Clinch River, Poplar Creek, corresponds to item #8 on Attachment 1. Enclosure #2: Mercury in Fish, Poplar Creek, 1976, corresponds to item #9 on Attachment 1.

To assure our ability to communicate on this matter in the future, we request DOE provide copies of the fifteen documents in the form it is released under the FOI.

Any questions concerning the enclosures recreated in this transmittal should be referred to T. R. Butz at 4-3647.

Very truly yours,

A handwritten signature in black ink, appearing to read "Gordon G. Fee".

Gordon G. Fee, Plant Manager
 Oak Ridge Y-12 Plant

GGF:TRB:eh

Attachment 1: Y-12 Data

Enclosure 1: Mercury in Fish 1976, Melton Hill Lake, Clinch River, Poplar Creek
 2: Mercury in Fish, Poplar Creek, 1976

DOE, Mr. H. D. Hickman

Page 2

June 10, 1983

cc/att: T. R. Butz - RC
G. G. Fee
R. F. Hibbs
H. D. Hickman
J. F. Wing, DOE-ORO
J. C. White

cc: M. L. Jones
R. G. Jordan
L. F. Willis
W. J. Wilcox, Jr.

1977 Ha' Aretz.



UNION CARBIDE CORPORATION
NUCLEAR DIVISION

P. O. BOX Y, OAK RIDGE, TENNESSEE 37830

SO 2383 Mercury

Y/AD-428
(M-477)

June 9, 1977

United States Energy Research and Development
Administration, Oak Ridge Operations
Post Office Box E
Oak Ridge, Tennessee 37830

8724

Attention: Mr. H. D. Hickman

Gentlemen:

UNCLASSIFIED VERSION OF
Mercury Inventory at Y-12 Plant 1950 through 1977

ext. corresp.
#229
M-477
D-17

Attached is the information you requested regarding mercury releases in the Y-12 area. Also attached is additional information to support this mercury review.

Please let us know if further information is desired.

Very truly yours,

for J. M. Case, Plant Manager
Oak Ridge Y-12 Plant

DWS:jai

Attachments: "Solvent Losses through Ventilation Exhaust Systems, Bldg. 9201-5" (C) 3-14-56

little to Burkhardt letter ✓

"Estimated Mercury Losses in Creek Waters 1955 through 1975" (OUO) S-5-77

Napier to Smith letter ✓

Distribution, Series A:

- Copies 1-5: H. D. Hickman
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7: J. M. Case
8: R. F. Hibbs
9: R. G. Jordan
10: J. D. McLendon
11: C. J. Parks
12: R. D. Williams

Distribution, Series C:

H. D. Hickman, DOE-ORO

SUMMARY

The Y-12 Plant was involved with the handling of production quantities of mercury from 1950 through 1963. The maximum inventory in the Plant was during 1956-1957.

[Deleted]

[2.4 million pounds has either been lost or is material unaccounted for.]

Known losses are:

1. Airborne losses
2. Creek losses
3. Recorded spills
4. Deliberate overage in bottling of Y-12 mercury for GSA

Material unaccounted for:

1. Salvage still in 9201-4
2. Anticipated overage in 9201-4 inventory
3. Mercury carried out on equipment during 9201-5 stripping operations
4. Mercury retained in the extract or "tails" material during lithium processing
5. Probable shortage of mercury in the original inventory when the system was charged by Rust Engineering Company

The majority of the mercury which was released to the environment occurred during early operations of the Calex Process, 1955 through 1958. This material was discharged either to the air, lost to the creek (approximately 230,000 pounds), or lost in the earth.

The airborne losses were reduced to practically zero in 1958. The creek losses have been less than the minimum detectable limit since 1963. There have not been any earth losses reported since operations were terminated in 1966.

Current practices and procedures for the bottling of the existing inventory minimize the possibility of any creek or earth losses. Air losses continue to be minimal. Processes are being developed to prevent the loss of any mercury when the remaining process equipment is washed and stripped from Building 9201-4.

CONCLUSIONS

1. Based on the past ten years data, it appears in the future the creek losses will not exceed the drinking standard for water.
2. In comparing loss data at the source (9201-4 and 9201-5) and the creek data leaving Y-12 with the approximate or actual date of known losses to the earth, there is no evidence that these ground losses had or have reached Poplar Creek.
3. Based on the water quality leaving Y-12 in the past 14 years by effluent sampling, it is concluded that losses to the earth are contained in the shale beneath the spill locations.
4. If the soil from the creek were excavated in a strip 20 ft. wide, 20 miles long, and to a depth of 12 inches, it would totally destroy the creek and would remove less than 4,000 pounds of mercury.
5. After inspection of all identified spill locations, it is felt that no further excavation is warranted.

RECOMMENDATIONS

1. It is recommended that monitoring for total soluble mercury in the east fork of Poplar Creek be continued.
2. Limited data on soil samples are available from the east fork of Poplar Creek. It is recommended that soil samples be taken on an annual basis to determine the rate in which the soil in the creek is being purged of mercury.
3. It is recommended that soil samples be taken in future major excavations of areas that had large quantities of mercury used and/or lost. This would determine if salvage operations are warranted.
4. A survey was made of mercury processing areas, known mercury spill locations, and the mercury storage area with the following recommendations being made:
 - a. 81-10 - Visible mercury should be cleaned up and the mercury trap and settling basin cleaned.
 - b. 9201-5 - One small area contaminated with mercury was found. This will be cleaned up.
 - c. Increase clean-up activities in the Feed Prep./Extraction and the Evaporator areas. Drain equipment and pipe lines in the same manner that the cascade equipment is being emptied. This will leave the entire building in a "drip free" condition until final stripping is initiated.

June 9, 1977

- d. Mercury storage (Building 9720-26) - No changes are recommended.
- e. 9201-2 - The basement area of this building was examined in those areas where known spills and excavation had taken place. No visible mercury was seen.

~~SECRET~~

~~CONFIDENTIAL~~

UNION CARBIDE CORPORATION

NUCLEAR DIVISION

P. O. BOX Y, OAK RIDGE, TENNESSEE 37830

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DOCUMENT NUMBER: Y/AD-00032

INVENTORIED SEP 22 1980

June 9, 1977

Y/EXT-00032/DEL REV

Classification changed to

CRD

(Insert appropriate classification level and category)

by authority of

YPA-858 8/19/94

(Authority for change in classification) (Date)

by

Mary T. Davis 10/29/94

(Signature of person making change) (Date)

Verified by

Sara L. Mayler 10/29/94

(Signature of person verifying change) (Date)

Mercury Inventory at Y-12 Plant 1950 through 1977 (u)

Attached is the information you requested regarding mercury releases in the Y-12 area. Also attached is additional information to support this mercury review.

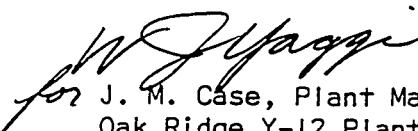
Please let us know if further information is desired.

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW

Reviewer: <u>O. K. McConnell, Jr.</u> (Name)	Determination <u>2</u> [Insert Number(s)]
Authority: <input checked="" type="radio"/> ADC <input type="radio"/> ADD	1. Classification Retained
Date:	2. Classification Changed To: <u>CRD</u>
Reviewer: <u>R. Bangs Jr.</u> (Name)	3. Contains No DOE Classified Information
Authority: <input checked="" type="radio"/> ADD	4. Classification Cancelled
Date: <u>3/19/94</u>	5. Classified Information Bracketed
6. Other (Specify): _____	

UWS:jdt

Very truly yours,

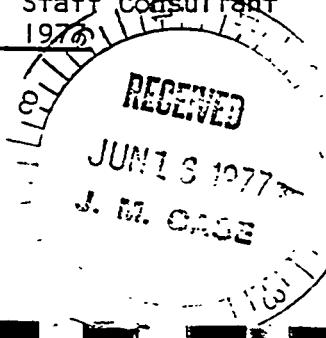

for J. M. Case, Plant Manager
Oak Ridge Y-12 Plant

RESTRICTED DATA - This document contains restricted data as defined in the Atomic Energy Act of 1954. Its transmittal or the disclosure of its contents in any manner to an unauthorized person is prohibited.

Classified by: D. W. Smith

D. W. Smith, Production
Staff Consultant

Date: June 13, 1977


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J. M. CASE

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USERDA

-5-

June 9, 1977

INVENTORY BALANCE

Total mercury received in Y-12	24,321,000 ✓
Bottled prior to 1977 ^{2-4,5 draining} ^{b-1?}	()
Estimate of overage when filling bottles ¹	(12,000)
Estimate of material removed in 9201-5 stripping ²	10,000
Recovered by Mallory Battery Company ^{a-5} salvage	111,000
Estimate from decommission of facility?	()
Mercury in extract produced ³	(1,000)
Book inventory 9201-4 December 31, 1976	()
Estimated inventory error ⁴	()
Estimated hold up in 9201-4 salvage ⁵	100,000
Estimated hold up in 9201-4 equipment ⁶	100,000
Total estimated 9201-4 inventory	()
Measured loss 9201-5 March, 1966	49,853
Creek losses through 1972 ⁷ (soluble)	235,000
Creek losses through 1964 ⁸ (entrained, estimated)	235,000
Mercury in sludge removed from New Hope Pond ⁹	7,200
Airborne losses 1955 through 1963 ¹⁰	30,000
Total mercury accounted for	22,440,301
Total mercury unaccounted for	1,880,699

¹ Y-12 bottling procedure calls for filling bottles to 76 pounds -0+2 ounces² All equipment removed from 9201-5 had some mercury contamination³ Over pounds of extract produced with a mercury content⁴ From 9201-4 bottling experience to date, the total to be drained from process equipment will be approximately⁵ Based on mercury recovered from similar salvage materials from Mallory Battery Company (Excess Sale UCC-ND 2085)⁶ Based on 9201-5 stripping experience⁷ Creek losses 1955 to present⁸ No analysis available on entrained material. Estimated to be equal to soluble mercury⁹ Average analysis of sludge removed from New Hope Pond¹⁰ Letter J. C. Little to distribution dated March 4, 1956~~CONFIDENTIAL~~
~~SECRET~~

~~SECRET~~

USERDA

-6-

June 9, 1977

HISTORY

I. Development and Pilot Facilities

- a. Building 9733-2 - Development facility for the Elex Process (Electrical Exchange). Operated 1950 and 1951.

Mercury inventory - 2,000 to 4,000 pounds.

Effluent control - This facility had a steel sump or trap installed in the floor drain system before entering the storm sewer. This trap was routinely checked and emptied. This system was incorporated on all of the future development and pilot facilities. Except in the event of gross spills, it proved effective in preventing metallic mercury from entering the creek.

Losses - There were no major losses reported.

- b. Building 9733-1 - Development facility for the Orex (Organic Exchange). Operated 1951 and 1952.

Mercury inventory - 3,000 to 5,000 pounds.

Effluent control - Same as 9733-2.

Losses - There were no major losses reported.

- c. Building 9201-2 - Pilot plant for the Elex Process and for the Colex (Column Exchange) Process. Operated September, 1951 through 1955.

Mercury inventory - 320,000 pounds.

This building housed several pilot plants and equipment test facilities over the four-year period and was Y-12's first involvement with significant quantities of mercury. During the operation of the different facilities there was a total loss of 108,000 pounds. Major recovery operations were conducted by excavation of dirt from the basement of this building. Visible mercury was collected from the dirt. The rest of the dirt was stored and later processed through the Nichols Herschott furnace at Building 81-10. At one time recovery attempts were made by manually digging at the storm sewer discharge to the creek. (N. K. Bernander). There was very little mercury recovered in this attempt.

Although there was a large amount of material unaccountable as a result of operations, there is no record of any one large spill that was lost to the environment.

- d. Building 9202 - Pilot plant for the Orex Process. Building operated April, 1953 through May, 1954.

Mercury inventory - approximately 250,000 pounds.

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Operations in this building were of the same magnitude as the 9201-2 facilities. Estimated losses were 50,000 pounds. There were no major spills recorded; however, when a mercury inventory showed a significant loss and it had not been recovered in the trap outside the building, the storm sewer between the building and the trap was excavated and an attempt to recover the mercury was made. The dirt from the recovery operation was stored for later processing in the Nichols Hershoff furnace. (A. D. Ryan).

2. Production Plants

a. 9204-4 Elex Production Plant operated 1953 through Spring, 1956.

Mercury inventory - 1,516,768 pounds. At the end of the program, the inventory showed a loss of 71,000 pounds. The design of this operation reduced the probability of major spills. The majority of the process equipment was on the upper levels of the building and spills could be cleaned up before getting to the outside. There were occasional spills in the salvage recovery area in the basement, some of which could have been lost to the storm drain or to the earth through cracks in the floor.

b. 9201-5 Colex Production Plant. Operated January, 1955 through February, 1959, and partial operations were resumed for a Lithium-7 production run in December, 1962 through May, 1963. The building was stripped of process equipment in 1965 and 1966.

Original design provided for two settling tanks to collect process overflows to prevent loss of mercury to the creek. The system was soon modified to also catch all of the building floor drains. All building effluent was pumped to a neutralizing sump south of the building where it was periodically pumped to the storm sewer. Development studies resulted in minimizing the flow to this sump and using it as a settling basin with a continuously monitored overflow.

During the initial building startup, there were numerous mercury and amalgam spills in the building. Although the volume of the spills was not recorded, recovery operations were considered to be effective but it must be assumed that mercury was lost both to the ground and to the storm sewer system.

There were three known spills of mercury on the ground outside of 9201-5 and two major spills inside the building during this period where mercury is known to have been discharged to the environment. These will be discussed in detail later.

c. 9201-4 Colex Production Plant. Operated June, 1955 through December, 1962. The design of this building was similar to that of 9201-5. Process and waste treatment improvement parallel those in 9201-5. The major auxiliary operations (Feed Prep., Extract, and Evaporation) for both buildings were conducted at 9201-4.

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June 9, 1977

There were no reported major spills to the environment at this building. Process spills and leaks were similar in nature and magnitude as those in 9201-5.

- d. Building 81-10 - This facility was constructed in 1956 and 1957. Operations were intermittently from March, 1957 through May, 1962. This facility was designed to recover mercury from solid wastes by evaporation and condensation. The primary feedstocks for the facility were filter solids (both lithium carbonate and powdered graphite), decomposer graphite, floor sweepings, "sludge" (solids recovered from settling tanks), and contaminated dirt (from excavating outside or ground spills). During the operating life of this facility approximately 3,600,000 pounds of mercury were processed and returned to the Colex buildings. The facility was constructed on a concrete pad with the drains being collected in a concrete mercury trap. All of the effluent from this facility flowed through the trap to a settling basin before being discharged to the creek.

Losses to the surrounding area were experienced through cracks in the concrete, water leaving the facility, and airborne losses.

3. Spills

There were five major spills during the Y-12 operations where mercury was released to the environment. These are in addition to the losses reported for 9201-2 and 9202.

a. Summer, 1955

200-400 gallons (22,500 - 45,000 pounds).

Northeast corner, 9201-5.

Condition - Plugged decomposer, Cascade I or Cascade IA. Amalgam forced out of hydrogen vent.

Recovery - Visible mercury shoveled off of ground (earth). Backhoes brought in to excavate. Drums of salvage dirt later processed at 81-10. (T. W. Robinson, G. W. Evans).

b. December 31, 1955

1,000 - 1,500 gallons (113,000 - 170,000 pounds)..

South end of Crane Bay 6 (inside) 9201-5.

Condition - Ruptured expansion joint on discharge of Moyno pump. Mercury sprayed through south end of building.

Recovery - All visible mercury recovered inside building. Some mercury released through basement of fan room floor.

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c. Summer, 1956

200-800 gallons (22,500 - 90,000 pounds).

Lost on ground at mercury dumping station.

Condition - Improper valving while transferring mercury from 9204-4 to 9201-4 and 9201-5.

Recovery - Visible mercury recovered by manually shoveling up surface dirt. Excavation by backhoes. The dirt excavated was stored in drums and later fed to Nichols Hershoff furnace at 81-10. (J. E. Smyrl).

d. Summer, 1956

200-800 gallons (22,500 - 90,000 pounds).

Lost on ground north of First Street at ramp entering 9201-5.

Condition - Improper valving while transferring mercury from 9201-5 to 9201-4.

Recovery - Visible mercury recovered by manually shoveling and vacuuming. Excavation by backhoes with dirt drummed and later fed to 81-10. (J. E. McNabb, W. H. Hubbs, D. W. Smith).

e. March, 1966

890 gallons (100,000 pounds).

9201-5 Fan Rooms E and F.

Condition - Leaky "sight glass" on storage tanks.

Recovery - Visible mercury recovered by vacuuming and sweeping (approximately 50,000 pounds recovered).

Core drilled in basement to locate remaining mercury. No significant quantity was located.

This spill documented in United States Atomic Energy Commission report of investigating committee, "Loss of Mercury at the Y-12 Plant," dated 1966.

4. Losses

- a. Airborne losses - During operations, a maximum of 30,000 pounds have been lost as airborne losses. (Letter J. C. Little to distribution dated March 4, 1956). Calculated quantity is based on Alpha-5 operations of 400 days at 20 pounds/day and 1100 days at 5 pounds/day; Alpha-4 operations of 250 days at 20 pounds/day and 2200 days at 5 pounds/day.

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- b. Creek losses - Creek losses of mercury totaled 470,000 pounds through 1962, with an additional 5,000 pounds being lost through 1972. Since 1972, losses have been less than 18 pounds/year. (Letter J. M. Nacier to D. W. Smith dated March 5, 1977).
- c. Spills - An estimate of losses to the earth is difficult to establish; however, from the inventory balance this loss could be as much as 1,880,699 pounds. The sum of unrecovered mercury from the five spills is estimated between 150,000 and 225,000 pounds.

INVENTORY SHORTAGE

During the charging of the Colex System (9201-4 and 9201-5) in 1955, Rust Engineering Company emptied flasks of mercury. This operation was done over a period of 6 to 8 months. Although the receiving vouchers showed the quantity of flasks received to be correct, there was some comment made at that time (undocumented) that some of the flasks were only partially full or empty at the time they were emptied.

It is felt that there was an initial inventory shortage at the time the system was filled; however, no finite number is being assigned for this shortage. The following evidence is offered to support this conclusion.

1. As early as 1958 when the first mercury was being flasked and returned to GSA leaky flasks were found. These flasks were discarded.
2. During storage, it was found that some of the accepted flasks (20-25 psi pressure test) were "leakers" and these were removed from Y-12 storage upon detection.
3. These flasks were the same ones that the mercury was received in and had been in storage throughout the world for an undetermined period.

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INVENTORY BALANCE

Total mercury received in Y-12

Bottled prior to 1977

Estimate of overage when filling bottles¹Estimate of material removed in 9201-5
stripping²sludge?³
Recovered by Mallory Battery CompanySurf?⁴
Estimate from decommission of facilitytails?⁵
Mercury in extract produced⁶

Book inventory 9201-4 December 31, 1976

Estimated inventory error⁴Estimated hold up in 9201-4 salvage⁵Estimated hold up in 9201-4 equipment⁶

Total estimated 9201-4 inventory

Measured loss 9201-5 March, 1966 49,853

Creek losses through 1972⁷ (soluble) 235,000Creek losses through 1964⁸ (entrained, estimated) 235,000Mercury in sludge removed from New Hope Pond⁹ 7,200Airborne losses 1955 through 1963¹⁰ 30,000

Total mercury accounted for

Total mercury unaccounted for

Deleted
1,880,699¹Y-12 bottling procedure calls for filling bottles to 76 pounds -0+2 ounces²All equipment removed from 9201-5 had some mercury contaminationDeleted⁷Creek losses 1955 to present⁸No analysis available on entrained material. Estimated to be equal to soluble mercury⁹Average analysis of sludge removed from New Hope Pond¹⁰Letter J. C. Little to distribution dated March 4, 1956

HISTORY

I. Development and Pilot Facilities

- a. Building 9733-2 - Development facility for the Elex Process (Electrical Exchange). Operated 1950 and 1951.

Mercury inventory [Deleted]

Effluent control - This facility had a steel sump or trap installed in the floor drain system before entering the storm sewer. This trap was routinely checked and emptied. This system was incorporated on all of the future development and pilot facilities. Except in the event of gross spills, it proved effective in preventing metallic mercury from entering the creek.

Losses - There were no major losses reported.

- b. Building 9733-1 - Development facility for the Orex (Organic Exchange). Operated 1951 and 1952.

Mercury inventory - [Deleted]

Effluent control - Same as 9733-2.

Losses - There were no major losses reported.

- c. Building 9201-2 - Pilot plant for the Elex Process and for the Colex (Column Exchange) Process. Operated September, 1951 through 1955.

Mercury inventory - [Deleted]

This building housed several pilot plants and equipment test facilities over the four-year period and was Y-12's first involvement with significant quantities of mercury. During the operation of the different facilities there was a total loss of 108,000 pounds. Major recovery operations were conducted by excavation of dirt from the basement of this building. Visible mercury was collected from the dirt. The rest of the dirt was stored and later processed through the Nichols Hershoff furnace at Building 81-10. At one time recovery attempts were made by manually digging at the storm sewer discharge to the creek. (N. K. Bernander). There was very little mercury recovered in this attempt.

Although there was a large amount of material unaccountable as a result of operations, there is no record of any one large spill that was lost to the environment.

- d. Building 9202 - Pilot plant for the Orex Process. Building operated April, 1953 through May, 1954.

Mercury inventory - [Deleted]

June 9, 1977

Operations in this building were of the same magnitude as the 9201-2 facilities. Estimated losses were 50,000 pounds. There were no major spills recorded; however, when a mercury inventory showed a significant loss and it had not been recovered in the trap outside the building, the storm sewer between the building and the trap was excavated and an attempt to recover the mercury was made. The dirt from the recovery operation was stored for later processing in the Nichols Hershoff furnace. (A. D. Ryan).

2. Production Plants

- a. 9204-4 Elex Production Plant operated 1953 through Spring, 1956.

Mercury Inventory ~~- Deleted~~ At the end of the program, the inventory showed a loss of 71,000 pounds. The design of this operation reduced the probability of major spills. The majority of the process equipment was on the upper levels of the building and spills could be cleaned up before getting to the outside. There were occasional spills in the salvage recovery area in the basement, some of which could have been lost to the storm drain or to the earth through cracks in the floor.

- b. 9201-5 Colex Production Plant. Operated January, 1955 through February, 1959, and partial operations were resumed for a Lithium-7 production run in December, 1962 through May, 1963. The building was stripped of process equipment in 1965 and 1966.

Original design provided ~~Deleted~~ settling tanks to collect process overflows to prevent loss of mercury to the creek. The system was soon modified to also catch all of the building floor drains. All building effluent was pumped to a neutralizing sump south of the building where it was periodically pumped to the storm sewer. Development studies resulted in minimizing the flow to this sump and using it as a settling basin with a continuously monitored overflow.

During the initial building startup, there were numerous mercury and amalgam spills in the building. Although the volume of the spills was not recorded, recovery operations were considered to be effective but it must be assumed that mercury was lost both to the ground and to the storm sewer system.

There were three known spills of mercury on the ground outside of 9201-5 and two major spills inside the building during this period where mercury is known to have been discharged to the environment. These will be discussed in detail later.

- c. 9201-4 Colex Production Plant. Operated June, 1955 through December, 1962. The design of this building was similar to that of 9201-5. Process and waste treatment improvement parallel those in 9201-5. The major auxiliary operations (Feed Prep., Extract, and Evaporation) for both buildings were conducted at 9201-4.

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There were no reported major spills to the environment at this building. Process spills and leaks were similar in nature and magnitude as those in 9201-5.

- d. Building 81-10 - This facility was constructed in 1956 and 1957. Operations were intermittently from March, 1957 through May, 1962. This facility was designed to recover mercury from solid wastes by evaporation and condensation. The primary feedstocks for the facility were filter solids (both lithium carbonate and powdered graphite), decomposer graphite, floor sweepings, "sludge" (solids recovered from settling tanks), and contaminated dirt (from excavating outside or around spills).

Deleted

The facility was constructed on a concrete pad with the drains being collected in a concrete mercury trap. All of the effluent from this facility flowed through the trap to a settling basin before being discharged to the creek.

Losses to the surrounding area were experienced through cracks in the concrete, water leaving the facility, and airborne losses.

3. Spills

There were five major spills during the Y-12 operations where mercury was released to the environment. These are in addition to the losses reported for 9201-2 and 9202.

sb 11-56
a. Summer, 1955

200-400 gallons (22,500 - 45,000 pounds).

112.5 lb/gal.

Northeast corner, 9201-5.

Condition - Plugged decomposer,

Deleted

Recovery - Visible mercury shoveled off of ground (earth). Backhoes brought in to excavate. Drums of salvage dirt later processed at 81-10. (T. W. Robinson, G. W. Evans).

sb 1-1-56
b. December 31, 1955

1,000 - 1,500 gallons (113,000 - 170,000 pounds).

South end of Crane Bay 6 (Inside) 9201-5.

Condition - Ruptured expansion joint
Mercury sprayed through south end of building.

Deleted

Recovery - All visible mercury recovered inside building. Some mercury released through basement of tan room floor.

June 9, 1977

c. Summer, 1956

200-800 gallons (22,500 - 90,000 pounds).

Lost on ground at mercury dumping station.

Condition - Improper valving while transferring mercury from 9204-4 to 9201-4 and 9201-5.

Recovery - Visible mercury recovered by manually shoveling up surface dirt. Excavation by backhoes. The dirt excavated was stored in drums and later fed to Nichols Hershoff furnace at 81-10. (J. E. Smyrl).

d. Summer, 1956

200-800 gallons (22,500 - 90,000 pounds).

Lost on ground north of First Street at ramp entering 9201-5.

Condition - Improper valving while transferring mercury from 9201-5 to 9201-4.

Recovery - Visible mercury recovered by manually shoveling and vacuuming. Excavation by backhoes with dirt drummed and later fed to 81-10. (J. E. McNabb, W. H. Hubbs, D. W. Smith).

e. March, 1966

890 gallons (100,000 pounds).

9201-5 Fan Rooms E and F.

Condition - Leaky "sight glass" on storage tanks.

Recovery - Visible mercury recovered by vacuuming and sweeping
Deleted

Core drilled in basement to locate remaining mercury. No significant quantity was located.

This spill documented in United States Atomic Energy Commission report of investigating committee, "Loss of Mercury at the Y-12 Plant," dated 1966.

4. Losses

- a. Airborne losses - During operations, a maximum of 30,000 pounds have been lost as airborne losses. (Letter J. C. Little to distribution dated March 4, 1956). Calculated quantity is based on Alpha-5 operations of 400 days at 20 pounds/day and 1100 days at 5 pounds/day; Alpha-4 operations of 250 days at 20 pounds/day and 2200 days at 5 pounds/day.

= 29,500

int. corresp.
#49

June 9, 1977

- b. Creek losses - Creek losses of mercury totaled 470,000 pounds through 1962, with an additional 5,000 pounds being lost through 1972. Since 1972, losses have been less than 18 pounds/year. (Letter J. M. Napier to D. W. Smith dated March 5, 1977).
- c. Spills - An estimate of losses to the earth is difficult to establish; however, from the inventory balance this loss could be as much as 1,880,699 pounds. The sum of unrecovered mercury from the five spills is estimated between 150,000 and 225,000 pounds.

- 53% - 45%

INVENTORY SHORTAGE

During the charging of the Colex System (9201-4 and 9201-5) in 1955, Rust Engineering Company emptied ~~Deleted~~ flasks of mercury. This operation was done over a period of 6 to 8 months. Although the receiving vouchers showed the quantity of flasks received to be correct, there was some comment made at that time (undocumented) that some of the flasks were only partially full or empty at the time they were emptied.

It is felt that there was an initial inventory shortage at the time the system was filled; however, no finite number is being assigned for this shortage. The following evidence is offered to support this conclusion.

1. As early as 1958 when the first mercury was being flasked and returned to GSA leaky flasks were found. These flasks were discarded.
2. During storage, it was found that some of the accepted flasks (20-25 psi pressure test) were "leakers" and these were removed from Y-12 storage upon detection.
3. These flasks were the same ones that the mercury was received in and had been in storage throughout the world for an undetermined period.



UNION CARBIDE CORPORATION
NUCLEAR DIVISION
P. O. BOX Y, OAK RIDGE, TENNESSEE 37830

M-221

June 9, 1977

United States Energy Research and Development
Administration, Oak Ridge Operations
Post Office Box E
Oak Ridge, Tennessee 37830

8724

Attention: Mr. H. D. Hickman

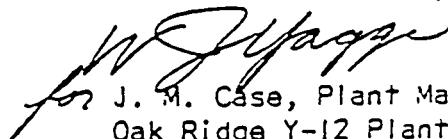
Gentlemen:

UNCLASSIFIED VERSION OF
Mercury Inventory at Y-12 Plant 1950 through 1977

Attached is the information you requested regarding mercury releases in the Y-12 area. Also attached is additional information to support this mercury review.

Please let us know if further information is desired.

Very truly yours,


for J. M. Case, Plant Manager
Oak Ridge Y-12 Plant

DWS:jai

Attachments: "Solvent Losses through
Ventilation Exhaust Systems, Bldg.
9201-5" (C)
"Estimated Mercury Losses in Creek
Waters 1955 through 1975" (QUO)

Distribution, Series A:

Copies 1-5: H. D. Hickman
6: D. J. Bostock(Y-12RC)
7: J. M. Case
8: R. F. Hibbs
9: R. G. Jordan
10: J. D. McLendon
11: C. J. Parks
12: R. D. Williams

Distribution, Series C:

H. D. Hickman, DOE-ORO

SUMMARY

The Y-12 Plant was involved with the handling of production quantities of mercury from 1950 through 1963. The maximum inventory in the Plant was during 1956-1957.

Deleted

[] 2.4 million pounds has either been lost or is material unaccounted for.

Known losses are:

1. Airborne losses
2. Creek losses
3. Recorded spills
4. Deliberate overage in bottling of Y-12 mercury for GSA

Material unaccounted for:

1. Salvage still in 9201-4
2. Anticipated overage in 9201-4 inventory
3. Mercury carried out on equipment during 9201-5 stripping operations
4. Mercury retained in the extract or "tails" material during lithium processing
5. Probable shortage of mercury in the original inventory when the system was charged by Rust Engineering Company

The majority of the mercury which was released to the environment occurred during early operations of the Colex Process, 1955 through 1958. This material was discharged either to the air, lost to the creek (approximately 230,000 pounds), or lost in the earth.

The airborne losses were reduced to practically zero in 1958. The creek losses have been less than the minimum detectable limit since 1963. There have not been any earth losses reported since operations were terminated in 1966.

Current practices and procedures for the bottling of the existing inventory minimize the possibility of any creek or earth losses. Air losses continue to be minimal. Processes are being developed to prevent the loss of any mercury when the remaining process equipment is washed and stripped from Building 9201-4.

CONCLUSIONS

1. Based on the past ten years data, it appears in the future the creek losses will not exceed the drinking standard for water.
2. In comparing loss data at the source (9201-4 and 9201-5) and the creek data leaving Y-12 with the approximate or actual date of known losses to the earth, there is no evidence that these ground losses had or have reached Poplar Creek.
3. Based on the water quality leaving Y-12 in the past 14 years by effluent sampling, it is concluded that losses to the earth are contained in the shale beneath the spill locations.
4. If the soil from the creek were excavated in a strip 20 ft. wide, 20 miles long, and to a depth of 12 inches, it would totally destroy the creek and would remove less than 4,000 pounds of mercury.
5. After inspection of all identified spill locations, it is felt that no further excavation is warranted.

RECOMMENDATIONS

1. It is recommended that monitoring for total soluble mercury in the east fork of Poplar Creek be continued.
2. Limited data on soil samples are available from the east fork of Poplar Creek. It is recommended that soil samples be taken on an annual basis to determine the rate in which the soil in the creek is being purged of mercury.
3. It is recommended that soil samples be taken in future major excavations of areas that had large quantities of mercury used and/or lost. This would determine if salvage operations are warranted.
4. A survey was made of mercury processing areas, known mercury spill locations, and the mercury storage area with the following recommendations being made:
 - a. 81-10 - Visible mercury should be cleaned up and the mercury trap and settling basin cleared.
 - b. 9201-5 - One small area contaminated with mercury was found. This will be cleaned up.
 - c. Increase clean-up activities in the Feed Prep./Extraction and the Evaporator areas. Drain equipment and pipe lines in the same manner that the cascade equipment is being emptied. This will leave the entire building in a "drip free" condition until final stripping is initiated.

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June 9, 1977

- d. Mercury storage (Building 9720-26) - No changes are recommended.
- e. 9201-2 - The basement area of this building was examined in those areas where known spills and excavation had taken place. No visible mercury was seen.

June 9, 1977

INVENTORY BALANCE

Total mercury received in Y-12

Bottled prior to 1977

Estimate of overage when filling bottles

Estimate of material removed in 9201-5
stripping²

Recovered by Mallory Battery Company

Estimate from decommission of facility

Mercury in extract produced³

Book Inventory 9201-4 December 31, 1976

Estimated inventory error⁴Estimated hold up in 9201-4 salvage⁵Estimated hold up in 9201-4 equipment⁶

Total estimated 9201-4 inventory

Measured loss 9201-5 March, 1966

49,853

Creek losses through 1972⁷ (soluble)

235,000

Creek losses through 1964⁸ (entrained, estimated)

235,000

Mercury in sludge removed from New Hope Pond⁹

7,200

Airborne losses 1955 through 1963¹⁰

30,000

Total mercury accounted for

Deleted

Total mercury unaccounted for

1,880,699

¹Y-12 bottling procedure calls for filling bottles to 76 pounds -0+2 ounces²All equipment removed from 9201-5 had some mercury contaminationDeleted⁷Creek losses 1955 to present⁸No analysis available on entrained material. Estimated to be equal to soluble mercury⁹Average analysis of sludge removed from New Hope Pond¹⁰Letter J. C. Little to distribution dated March 4, 1956

HISTORY

I. Development and Pilot Facilities

- a. Building 9733-2 - Development facility for the Elex Process (Electrical Exchange). Operated 1950 and 1951.

Mercury inventory [Deleted]

Effluent control - This facility had a steel sump or trap installed in the floor drain system before entering the storm sewer. This trap was routinely checked and emptied. This system was incorporated on all of the future development and pilot facilities. Except in the event of gross spills, it proved effective in preventing metallic mercury from entering the creek.

Losses - There were no major losses reported.

- b. Building 9733-1 - Development facility for the Orex (Organic Exchange). Operated 1951 and 1952.

Mercury inventory - [Deleted]

Effluent control - Same as 9733-2.

Losses - There were no major losses reported.

- c. Building 9201-2 - Pilot plant for the Elex Process and for the Colex (Column Exchange) Process. Operated September, 1951 through 1955.

Mercury inventory - [Deleted]

This building housed several pilot plants and equipment test facilities over the four-year period and was Y-12's first involvement with significant quantities of mercury. During the operation of the different facilities there was a total loss of 108,000 pounds. Major recovery operations were conducted by excavation of dirt from the basement of this building. Visible mercury was collected from the dirt. The rest of the dirt was stored and later processed through the Nichols Hershoff furnace at Building 81-10. At one time recovery attempts were made by manually digging at the storm sewer discharge to the creek. (N. K. Bernander). There was very little mercury recovered in this attempt.

Although there was a large amount of material unaccountable as a result of operations, there is no record of any one large spill that was lost to the environment.

- d. Building 9202 - Pilot plant for the Orex Process. Building operated April, 1953 through May, 1954.

Mercury inventory - [Deleted]

June 9, 1977

Operations in this building were of the same magnitude as the 9201-2 facilities. Estimated losses were 50,000 pounds. There were no major spills recorded; however, when a mercury inventory showed a significant loss and it had not been recovered in the trap outside the building, the storm sewer between the building and the trap was excavated and an attempt to recover the mercury was made. The dirt from the recovery operation was stored for later processing in the Nichols Hershoff furnace. (A. D. Ryan).

2. Production Plants

- a. 9204-4 Elex Production Plant operated 1953 through Spring, 1955.

Mercury inventory. ~~Deleted~~ At the end of the program, the inventory showed a loss of 71,000 pounds. The design of this operation reduced the probability of major spills. The majority of the process equipment was on the upper levels of the building and spills could be cleaned up before getting to the outside. There were occasional spills in the salvage recovery area in the basement, some of which could have been lost to the storm drain or to the earth through cracks in the floor.

- b. 9201-5 Colex Production Plant. Operated January, 1955 through February, 1959, and partial operations were resumed for a Lithium-7 production run in December, 1962 through May, 1963. The building was stripped of process equipment in 1965 and 1966.

Original design provided ~~Deleted~~ settling tanks to collect process overflows to prevent loss of mercury to the creek. The system was soon modified to also catch all of the building floor drains. All building effluent was pumped to a neutralizing sump south of the building where it was periodically pumped to the storm sewer. Development studies resulted in minimizing the flow to this sump and using it as a settling basin with a continuously monitored overflow.

During the initial building startup, there were numerous mercury and amalgam spills in the building. Although the volume of the spills was not recorded, recovery operations were considered to be effective but it must be assumed that mercury was lost both to the ground and to the storm sewer system.

There were three known spills of mercury on the ground outside of 9201-5 and two major spills inside the building during this period where mercury is known to have been discharged to the environment. These will be discussed in detail later.

- c. 9201-4 Colex Production Plant. Operated June, 1955 through December, 1962. The design of this building was similar to that of 9201-5. Process and waste treatment improvement parallel those in 9201-5. The major auxiliary operations (Feed Prep., Extract, and Evaporation) for both buildings were conducted at 9201-4.

June 9, 1977

There were no reported major spills to the environment at this building. Process spills and leaks were similar in nature and magnitude as those in 9201-5.

- d. Building 81-10 - This facility was constructed in 1956 and 1957. Operations were intermittently from March, 1957 through May, 1962. This facility was designed to recover mercury from solid wastes by evaporation and condensation. The primary feedstocks for the facility were filter solids (both lithium carbonate and powdered graphite), decomposer graphite, floor sweepings, "sludge" (solids recovered from settling tanks), and contaminated dirt (from excavating outside or around spills).

Deleted

The facility was constructed on a concrete pad with the drains being collected in a concrete mercury trap. All of the effluent from this facility flowed through the trap to a settling basin before being discharged to the creek.

Losses to the surrounding area were experienced through cracks in the concrete, water leaving the facility, and airborne losses.

3. Soils

There were five major spills during the Y-12 operations where mercury was released to the environment. These are in addition to the losses reported for 9201-2 and 9202.

- a. Summer, 1955

200-400 gallons (22,500 - 45,000 pounds).

Northeast corner, 9201-5.

Condition - Plugged decomposer,

Deleted

Recovery - Visible mercury shoveled off of ground (earth). Backhoes brought in to excavate. Drums of salvage dirt later processed at 81-10. (T. W. Robinson, G. W. Evans).

- b. December 31, 1955

1,000 - 1,500 gallons (113,000 - 170,000 pounds).

South end of Crane Bay 6 (Inside) 9201-5.

Condition - Ruptured expansion joint

Deleted

Mercury sprayed through south end of building.

Recovery - All visible mercury recovered inside building. Some mercury released through basement of tan room floor.

June 9, 1977

c. Summer, 1956

200-800 gallons (22,500 - 90,000 pounds).

Lost on ground at mercury dumping station.

Condition - Improper valving while transferring mercury from 9204-4 to 9201-4 and 9201-5.

Recovery - Visible mercury recovered by manually shoveling up surface dirt. Excavation by backhoes. The dirt excavated was stored in drums and later fed to Nichols Hershoff furnace at 81-10. (J. E. Smyrl).

d. Summer, 1956

200-800 gallons (22,500 - 90,000 pounds).

Lost on ground north of First Street at ramp entering 9201-5.

Condition - Improper valving while transferring mercury from 9201-5 to 9201-4.

Recovery - Visible mercury recovered by manually shoveling and vacuuming. Excavation by backhoes with dirt drummed and later fed to 81-10. (J. E. McNabb, W. H. Hubbs, D. W. Smith).

e. March, 1966

890 gallons (100,000 pounds).

9201-5 Fan Rooms E and F.

Condition - Leaky "sight glass" on storage tanks.

Recovery - Visible mercury recovered by vacuuming and sweeping

Deleted

Core drilled in basement to locate remaining mercury. No significant quantity was located.

This spill documented in United States Atomic Energy Commission report of investigating committee, "Loss of Mercury at the Y-12 Plant," dated 1966.

4. Losses

- a. Airborne losses - During operations, a maximum of 30,000 pounds have been lost as airborne losses. (Letter J. C. Little to distribution dated March 4, 1956). Calculated quantity is based on Alpha-5 operations of 400 days at 20 pounds/day and 1100 days at 5 pounds/day; Alpha-4 operations of 250 days at 20 pounds/day and 2200 days at 5 pounds/day.

June 9, 1977

- b. Creek losses - Creek losses of mercury totaled 470,000 pounds through 1962, with an additional 5,000 pounds being lost through 1972. Since 1972, losses have been less than 18 pounds/year. (Letter J. M. Napier to D. W. Smith dated March 5, 1977).
- c. Spills - An estimate of losses to the earth is difficult to establish; however, from the inventory balance this loss could be as much as 1,880,699 pounds. The sum of unrecovered mercury from the five spills is estimated between 150,000 and 225,000 pounds.

INVENTORY SHORTAGE

During the charging of the Colex System (9201-4 and 9201-5) in 1955, Rust Engineering Company emptied Deleted flasks of mercury. This operation was done over a period of 6 to 8 months. Although the receiving vouchers showed the quantity of flasks received to be correct, there was some comment made at that time (undocumented) that some of the flasks were only partially full or empty at the time they were emptied.

It is felt that there was an initial inventory shortage at the time the system was filled; however, no finite number is being assigned for this shortage. The following evidence is offered to support this conclusion.

- 1. As early as 1958 when the first mercury was being flasked and returned to GSA leaky flasks were found. These flasks were discarded.
- 2. During storage, it was found that some of the accepted flasks (20-25 psi pressure test) were "leakers" and these were removed from Y-12 storage upon detection.
- 3. These flasks were the same ones that the mercury was received in and had been in storage throughout the world for an undetermined period.



Hg Quantities

24 million pounds

1st GSA deliveries in 12-52 (479K was part of the original issue)

P.64 → 1.5 million lbs. to fill β4 ("β4 involved much smaller quantities of Hg")

• 23,500 lbs. for development in 9733-1, 2, L-2

(pilots L-2, production in β-4, L-4, L-5)

procured outside U.S. (200 yr old wine jugs)

1.417 million lbs. transferred from β-4 to L-4, 5; 5K lbs. lost

Air

β-4 operations 8300 lost → air

β-4 Smelting 5000 lost → air

L-5 operations 19,500 lost → air

L-4 " 18,500 "

51,300

L-2 inventory 321,753 lbs. (186,596 transferred)

a scrap dealer recovered 54K

L-5 had 262K lbs in equipment; 200K collected, 50K lost;

L-4 is est'd to have 200K lbs. in equipment, 250K lbs. in sludge

• 81-10 furnace recovered 3.6 million lbs.

Equipment
P-313
P-315
P-113
P-114
P-106
P-105
P-104

Recoveries
Hg
SEW
AIR

174K lbs. sold to Mallory Battery Co. (NY) as sludge

Tails had 8-16 ppm Hg

acid wash of Hg (1956-58) had Hg
?-1963 PBO P-37 ↑ 1956-59

1983 inventory in 9720-26 = 6.4 million lbs.

The rush was on (1953 H bomb Russia)
destruction of documents

not 76 lbs/flask (not filled, not emptied, leaking)

know what went to equipment, not what was in each flask - accepted
shipments w/out paperwork (later vouchers issued)

P.94
Smelting
Chloralkali
Plant
P.143

Hg vapor pressure = .001 mm Hg₂₀
1956? 2.4 million ft³/min 2-4.5 ventilation rate

H₂O pre-New Hope Pond, acid releases resolvable Hg
Hg in distilled H₂O (25 ppb) - demineralizers
colloidal suspension, bleach (Cl⁻ more soluble)
but, analytical 1-74 to 6-77 only soluble Hg.
210.6 - 216.7 K lbs. (0 - <100)
1950-54 (no data) 11,300 lbs.
218,869 (<100)
7,500
1,275
238,944

New Hope Pond sediments 15,104 lbs.

Spills (6) 424,853 lbs.
3,000
427,853

L-Term structural member loss 66,610 (based on chlorophyll plants)

analytical wine
p. 113,117-18,240 * 31 (ES)

Hg Chemistry

$$\frac{7.4 \times 10^4 \text{ mg}}{\text{kg}} \times \frac{\text{g}}{1000 \text{ mg}} \times \frac{\text{kg}}{1000 \text{ ml}} * 100 = 7.4$$

ATSDR (1994).	<u>g/100ml</u>	<u>Pv</u>	<u>g/ml</u> * 100 = g/100ml
Hg ⁰	5.6×10^{-6}	2×10^{-3}	
HgCl ₂	7.4	0.1	
HgS	0	N.D.	
HgO	5×10^{-3} (ES: EXAH)		
Hg(NO ₃) ₂			

50 ppm
mg/L

$\frac{50}{10000}$
0.005

MERCURY PROCESSES AND ENVIRONMENTAL SAMPLING TIMELINE

Hg Task Force Report (Executive Summary):

Water

Hg concentrations [in the creek] were measured and reported quarterly beginning in 1954.

✓ Stream flows were measured and reported beginning in the last quarter of 1955.

Most of the Hg was discharged from 1957 to 1959.

80% of the Hg released from the Colex process before 1961 was soluble or a very finely divided suspension of mercuric oxide/ was a very dilute neutralized acid waste. This process waste stream was improved in 1958 and discontinued in 1963.

✓ New Hope Pond was built in 1963 and 1964.

Bear Creek may have been contaminated by Hg from the S-3 ponds as a result of a process (1950s and 1983) using about a pound per month of Hg as a catalyst (unrelated to lithium cascade).

Ground

1977 Case report took 2 weeks and found 5 spills in 9201-5.

1983 Wilcox report took 8 weeks and found 3 additional spills, in 9201-2 and 9202 (pilot plants).

Air

A urinalysis program started in 1953.

Y/EX-24

TKC 12-21
PAT

JCC-ND

NUCLEAR
DIVISION

UNION
CARBIDE

OPERATED BY
UNION CARBIDE CORPORATION
FOR THE UNITED STATES
DEPARTMENT OF ENERGY



MERCURY AT Y-12

A Study of Mercury Use at the
Y-12 Plant, Accountability, and
Impacts on Y-12 Workers and the
Environment - 1950 to 1983

(Unclassified version of
Y/EX-21 as verified Dec. 6, 1983,
by T. F. Davis,
ORO Classification Officer)

Compiled by The 1983 Mercury Task Force

August 18, 1983

Date of Issue: August 18, 1983

Y/EX-24

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Compiled by The 1983 Mercury Task Force

Oak Ridge Y-12 Plant
P.O. Box Y, Oak Ridge, Tennessee 37830

Prepared for the U.S. Department of Energy
under Contract No. W-7405-eng-28

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PREFACE

The publication of the declassified version of the 1977 Mercury Inventory Report, Y/AD-428, on May 17, 1983, precipitated much interest in the media and public about the use and impacts of that use of mercury at the Y-12 Plant. Mercury was used as a critical and major component in the chemical exchange process employed for separation of lithium isotopes, starting in 1950. The last production operation of these cascades was in 1963. Most of the mercury exposure to plant workers and losses to the environment occurred in the eight-year period of the Colex process operations from 1955 to 1962. It was felt important to bring in an independent group who had not been involved in the Colex operations to collect the available historical information on mercury accountability, to study the various programs for mercury salvage and recovery instituted through the years, and to summarize the several studies of mercury impacts on worker health and the environment that have been carried out. This task was assigned to a group designated the Mercury Task Force. This group was appointed on May 20, 1983, by Gordon G. Fee, Y-12 Plant Manager. The group is listed on the following pages. In addition to those assigned to the Task Force, numerous other people at Y-12 were called upon for assistance, and they responded most effectively. Several persons now retired from Union Carbide Corporation, the Atomic Energy Commission, and the Department of Energy who had been involved firsthand in the lithium isotope separation process were also consulted. We would like to acknowledge the assistance of all those who helped, particularly the following people: Leroy H. Jackson, Dr. R. E. Leed, Leo J. LaFrance, Neal Dow, Dr. J. M. Googin, Dr. J. W. Strohecker, George W. Evans, Dave A. Jennings, Dr. G. F. Zanolli, Dr. C. R. Richmond, and Dr. C. C. Lushbaugh of Oak Ridge Associated Universities.

This study required about eight weeks, being essentially completed insofar as the data portions are concerned prior to the hearings of July 11, 1983. The writing of this report took place over another four weeks. Much activity involving environmental sampling and mercury cleanup is under way at Y-12, and no attempt has been made to reflect that current activity in this report. The Executive Summary was updated to include the most recent results.

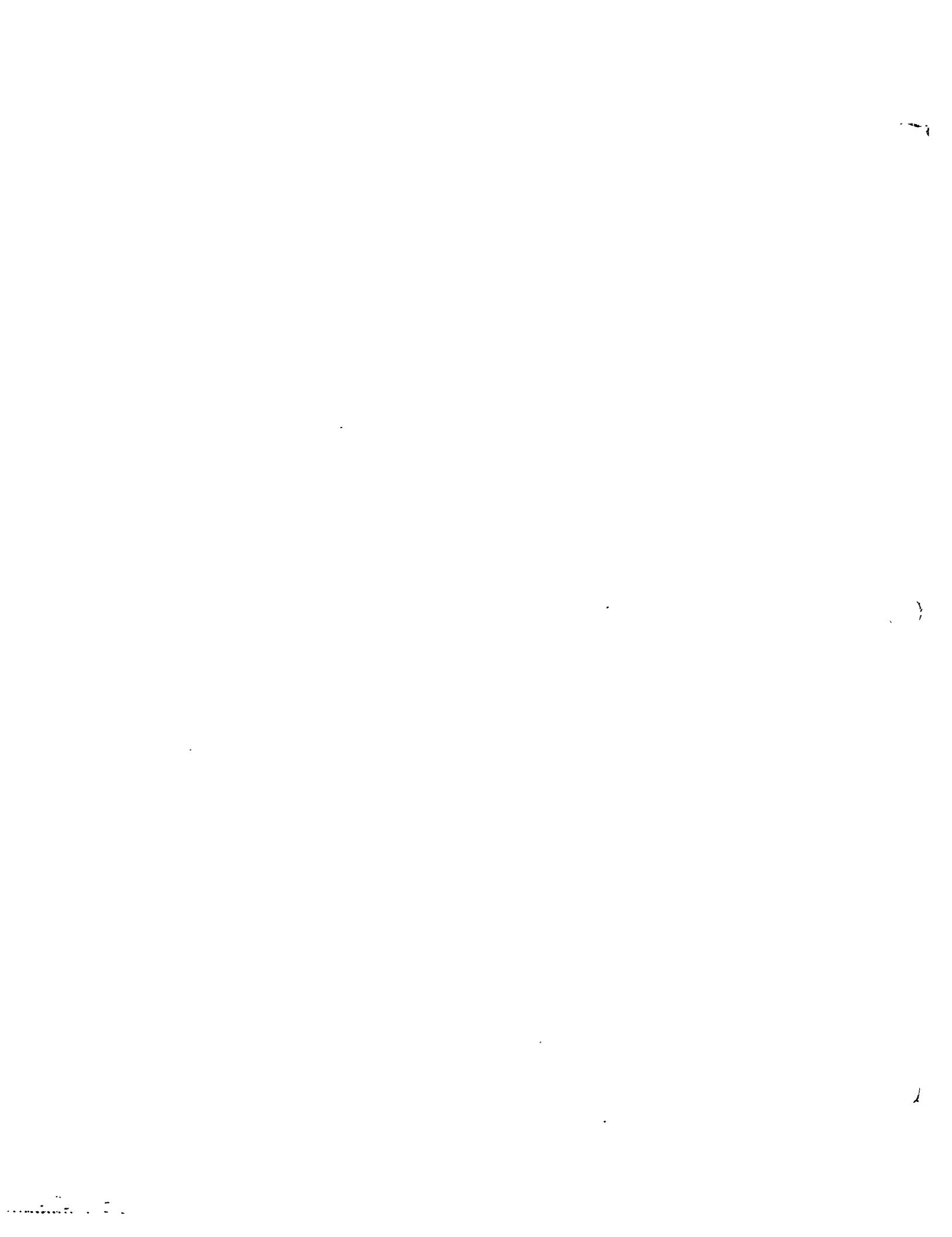
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EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

The first buildings of the Y-12 Plant were constructed along East Fork Poplar Creek in 1943 to carry out the first production-scale separation of uranium isotopes for the atomic bomb. Ten years later, in 1953, Y-12 was called upon to undertake the first production-scale separation of the isotopes of lithium for use in hydrogen bombs. Y-12's task this time was made urgent by the USSR hydrogen bomb test in the fall of that same year. Like the World War II uranium efforts, the lithium process effort required a crash construction program, the pioneering of a new technology, and the overcoming of major technical difficulties. But these efforts also were a success, and the Colex cascades were started up in 1955 after a remarkable 15-month construction period. Production stopped in 1963, having produced this essential strategic material needed for the national defense.

The process that made this challenging program a success is called Colex, the name being a contraction of "column-exchange." It is a chemical exchange process in which lithium isotopes are partially separated as they transfer between two chemical phases. One of these phases is an aqueous solution of lithium hydroxide and the other phase is a lithium amalgam, a solution of lithium in mercury. Many millions [REDACTED] of pounds of mercury were essential to the project. Directives signed by President Eisenhower made the mercury available from the National Stockpile. It was this mercury used for the Colex process from 1955 to 1963 that is the source of today's concerns.

WORKER HEALTH

Concern for mercury toxicity was very much on the minds of both Atomic Energy Commission (AEC) and Y-12 managers and industrial hygienists as they prepared in 1953 and 1954 for Colex operations. The process was to involve thousands of shift workers, and programs were instituted before the cascades went into operation to cope with the recognized hazards of breathing mercury vapor. Industrial hygiene programs were already in operation because of the need to protect worker health in the laboratory, pilot plant, and production programs under way in 1950-1954 on Orex and Elex as well as on Colex. But the scale of operations was to be expanded greatly, and much larger quantities of mercury were to be involved in Colex than in any of the previous operations.*

The building floors for Colex were modified so that the floor drains emptied into special tanks in the basement. These tanks were designed so that mercury could be recovered before the mop water, etc.,

*The amount of mercury and lithium amalgam pumped in Colex operations 1955 through 1963 was [REDACTED]

was released to other water-collecting sumps located inside and outside the buildings prior to entering the creek. These precautions were taken because it was recognized that Y-12 was pioneering an entirely new process using pumps and other equipment that had never before been utilized for such applications. The engineers anticipated frequent maintenance and operational troubles during start-up of the new processes. The first year of production, 1955, was indeed a troublesome one. Many problems developed with the equipment. Pumps and valves needed to be serviced often. The process equipment was full of mercury, and spillage or leakage of quantities during maintenance operations was expected and encountered. It was accommodated by special containers and procedures.

The mercury concentration in the workplace air was monitored frequently. (In 1956, 280,000 air readings were taken.) In the 1955 cascade start-up, many readings of mercury concentrations in the workplace air were higher than the 0.1 mg/m^3 then (0.05 mg/m^3 now) recommended. A urinalysis program started in 1953 was expanded to provide a check on the worker mercury exposures. During the time that elevated concentrations of mercury in air were encountered in 1955, the urinalysis data also showed elevated readings, although the averages for all the workers in the urinalysis program never exceeded the (then and now) recommended maximum urinalysis mercury value of 0.3 mg/L . Still, approximately 200 to 300 workers had readings that did exceed the 0.3-mg/L level during the latter part of 1955 and the early part of 1956. When a worker's urinary mercury or albumin values remained at a high level for several specimens, the individual involved was reassigned to another work area until the urinalysis mercury or albumin values dropped to the normal level; the employee then returned to work in the mercury area. Approximately 70 people were involved in temporary reassessments of this nature.

In addition to the air sampling and urinalysis programs, there was a special medical surveillance program involving clinical examinations of mercury workers being performed every six months. Persons with a history of albuminuria, kidney problems, or hypertension were screened out and not allowed to work with mercury.

Toward the latter part of the Colex start-up during 1955, AEC and Y-12 management undertook a crash program to bring the workplace mercury vapor levels down to acceptable levels. The program involved various efforts such as technical studies of substances that could reduce vapor pressure and agents that could dissolve tiny mercury droplets, studies of paints, etc. Engineering changes included a renovation of the ventilation systems in the buildings, and huge fans were installed in the end walls to provide more fresh air to the buildings. Other changes included major new housekeeping programs and the installation of a special house-vacuum system for mercury pickup. The effectiveness of these and additional administrative efforts is documented in the historical record of air concentrations that shows

that the mercury vapor in air levels were dramatically reduced and under control by March 1956 and stayed under control during the next seven years of operation.

In 1974 a consultant from the National Institute for Occupational Safety and Health (NIOSH), Dr. Z. Bell, reviewed the Y-12 data on mercury worker exposure. He selected 50 of the original workers, most of whom had received high exposures (based on urinalysis), and asked the Y-12 medical staff to examine them according to a protocol that he suggested. Examination of each of the 23 employees still on the payroll revealed no symptoms of mercury poisoning.

In 1983, Oak Ridge Associated Universities (ORAU) conducted a preliminary epidemiological study of the mortality of the Y-12 mercury worker population by comparing this group (1,477) to the other Y-12 workers (4,920) and then comparing both groups to the U.S. population as a whole. The purpose was to determine whether there is any evidence to suggest that the death rates are higher for the employees who worked in the Y-12 mercury-exposure areas than for other Y-12 employees. No such evidence was found. Death rates for mercury workers as a group were 93% of the rates for the U.S. population group to which they were compared, while the death rates for the Y-12 nonmercury workers were 90% of the rates for the U.S. population. The statistical confidence intervals for each category overlapped considerably, and no significant difference was found. Similarly, no difference was found between the Y-12 mercury workers and the other Y-12 workers in the death rates due to cancers, diseases of the central nervous system, respiratory diseases, or chronic nephritis.

MERCURY MATERIAL BALANCE

Another area of concern for this Task Force was to develop the best estimates possible in 1983 for the amount of mercury lost or unaccounted for from the lithium cascade operations. The figure most often reported in the media in recent months has been 2.4 million lb--usually referred to as "spilled" or "lost" mercury. The number comes from the Y-12 1977 memo, "Mercury Inventory at Y-12 Plant 1950 Through 1977," and in that memo the number is correctly referred to as being the amount of mercury lost plus that not accounted for. The distinction between lost and not-accounted-for mercury has at times been blurred, but in fact, most of the losses are pretty well known. The amount discharged to the air or into the creek is indeed "lost" from our control but it can be "accounted for."

The Task Force approach has been to first bring the 1977 numbers of mercury "accounted for" up to date. Millions of pounds [REDACTED] [REDACTED] of mercury were removed from the process equipment and flasked since January 1977. The other accounted-for numbers were reviewed and revised up or down as appropriate. A major effort was

expended on review of the best remaining records of mercury transfers into Y-12 and on restudy of the receiving operation.*

Then the losses were restudied as they were presented in the 1977 memo from the bases of history of the period, interviews, and reports. A number of previously not recognized "losses" were identified and added to the list. While some errors were found and new information turned up, the net differences between the 1977 and 1983 figures are not major ones, and they do not alter the picture drastically. Given the time allotted for the preparation of the 1977 report, namely two weeks, and the effort expended, two people working part-time, the accuracy of the 1977 "estimate" is commendable.

The final results of the 1983 Task Force Review are presented in detail in the table on p. 29 and in summary form below:

Mercury lost or not accounted for:	2.0 million lb
Known losses:	0.7 million lb
Not accounted for:	1.3 million lb

The 2.0 million lost or not accounted for is lower than the 2.4 million 1977 figure not because of a change in the estimated receipts, but due to net increases in several of the "accounted-for" categories. The great majority of the "accounted-for" material is that quantity actually put into flasks and weighed, and this number is very well known. The other numbers are as good estimates as we can establish from records and inspections.

The 0.7 million in known losses includes losses to the air, water, and land. Both the losses to air and land are much higher than estimated in our 1977 report (494,000 lb vs 87,000 lb), and the losses to the water (creek) are lower (239,000 lb vs 470,000 lb). The rationale for each of the new estimates was developed in detail by the Task Force, and it is the consensus of this group that these are better estimates than our 1977 numbers. The details of these environmental losses are discussed in the next section of this summary.

The 1.3 million lb not accounted for is then arrived at by difference. The Task Force identified several possible and probable explanations of where about half this mercury may be located. However, they are not well enough known to be included in "known losses" or "accounted for." These speculations total 645,000 lb. There are two of the probabilities which deserve mention here. One is an estimate of 60,000 lb, a very rough guess at what might be contained within the production building structures (walls, ceilings, floors, insulation, etc.). Since there is no analytical sampling basis for such an

*The mercury receiving operation was carried out by Rust Engineering for AEC, and all their records were transferred to the Records Depository in Atlanta and were destroyed as scheduled some years ago. Rust did not weigh the mercury as received from the General Services Administration (GSA). A pipeline led underground to the Colex cascades and accountability for the mercury passed to Y-12 at the valve in that receiving line.

estimate, the approach used was to follow the pattern of an Environmental Protection Agency (EPA) study of the chlor-alkali industry which showed substantial losses of mercury each year by this route in those kinds of plants.

A second and larger part of the not-accounted-for story is the big uncertainty in the amount of mercury actually received at Y-12. An intensive study of the available records of mercury procurement was carried out during June 1983. Persons who had worked in the Colex process were interviewed, and GSA offices in Washington, D.C., were visited to try to get information on which to base a better mercury material balance. But no "hard" data on the actual amounts shipped or received could be located. The speculation is that the difference between the quantity of mercury Y-12 was charged with and the quantity actually received might have been about 500,000 lb, perhaps half of the 1.3 not accounted for. One AEC official interviewed guessed the shortage might be as high as the equivalent of 900,000 lb. Obviously, there is no way the exact short-shippage can be determined at this date. The figure that appears in the table (p. 29), on which our "not-accounted-for" number is based, is the quantity charged to Y-12, the total of a number of transfer vouchers which AEC sent to Y-12 and stated to be the basis for Y-12 accountability. No actual weighing took place, either by GSA who furnished the mercury from the Government's strategic material stockpile, by Rust Engineering who received and dumped the mercury into the pipeline, or by Carbide who filled the cascades from the pipeline. Each of the tens of thousands of flasks [REDACTED] was assumed to contain 76.0 lb of mercury, the internationally accepted convention. But it is known from interviews with people involved in the original dumping operation that many flasks leaked, that some were only partly filled, and that some were even empty.

Even before the Colex process was shut down, Y-12 started to return some of the excess mercury to the GSA stockpile. One of the first shipments in 1957 involved thousands of flasks [REDACTED] [REDACTED] that had never even been opened at Y-12, but which were procured to serve as an operating reserve. In making arrangements for this shipment, the GSA instructed the AEC to ask Y-12 to ". . . ship only full units. Sort out obvious leakers or unfilled units" In addition, Y-12 filled a number of requests from other customers at AEC's instructions. However, because of the large number of complaints received about leaky flasks and shortages, Y-12 finally refused to ship any more until the mercury was reflasked. This evidence suggests that the original mercury shipments into Y-12 were not in good condition with regard to all flasks containing 76 lb. The correspondence between the AEC and the Y-12 Plant subsequent to this period reveals an increasing concern with poor flask conditions which culminated in the GSA decision to authorize AEC and Y-12 to procure new flasks and to rebottle the inventories on hand at Y-12 in these flasks. As a result, thousands of the old flasks [REDACTED] in poor condition were sold as scrap many years ago, and the [REDACTED] inventory now maintained at Y-12 as part of the

government's stockpile is carefully warehoused and kept in excellent condition (see photo, page 85).

The total of the guesses as to the whereabouts of the "not-accounted-for" 1.3 million at this time (including 0.5 million for shortage in receipts) is 0.645 million lb. Which is to say that the Task Force's estimate of the true amount "not accounted for" is about 650,000 lb. This is about 30% of the Y-12 mercury consumption.*

The Task Force noted with interest this statement in an EPA 1975 report on mercury accountability in the chlor-alkali industry: "We have made estimates to cover all known or suspected losses so that the amount of mercury introduced is accounted for. Actually, such accounting is not possible in a typical mercury cell chlor-alkali plant. Instead, for the industry as a whole, only about 50% of its annual mercury consumption can be accounted for. This does not imply that mercury is indiscriminately lost to the environment; rather it is most difficult to estimate where mercury may accumulate in the system and to what extent."**

ENVIRONMENT

The losses of mercury to the Y-12 environment as currently (1983) estimated can be summarized as follows:

Losses to air	51,000 lb
Losses to water	239,000 lb
Losses to land	<u>443,000</u> lb
	733,000 lb

Losses to the air largely occurred from the Colex process (38,000 lb) because of the mercury that got into the ambient air during maintenance operations and from the continuous operational losses in seepage from pumps and other equipment. The process required the pumping of hard-to-believe quantities of mercury under pressure--hundreds of millions [REDACTED] of pounds of mercury each day. In addition to the Colex losses to the building air and through the ventilation systems, the Elex process operations lost 8,300 lb through venting of mercury along with hydrogen gas produced in the process prior to its shutdown in 1957. Smelting of Elex scrap from Building 9204-4 discharged another 5,000 lb into the atmosphere. The Elex ("electrical-exchange") process predated Colex by several years;

*Computed by assuming the total Y-12 consumption was the difference between the amount received [REDACTED] and the amount returned [REDACTED]

**David Garrett, "Material Balance and Technology Assessment of Mercury and Its Compounds," EPA Report 560/3-75-007, prepared for Environmental Protection Agency, Office of Toxic Waste, 1975.

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Y-12 mercury material balance^a

	Best estimate, Mercury Task Force June 20, 1983	Best estimate, UCC Report June 9, 1977
Vouchered to Y-12	-24,348,852	24,321,000
Accounted for:		
Returned unopened or rebottled and stored/sold	21,666,348	
In LiOH tails, sold and stored	1,400	1,000
In Building 9201-5 scrap, sold	14,000	10,000
In Building 9201-5 sludge, sold to "Mallory"	174,000	111,000
As flasking overage, "given" to GSA	"17,212"	12,000
In Building 9201-4 equipment, still in place	200,000	
In sludges and sumps, Alpha-4	250,000	
In Building 9201-2 sewer pipe, at ORNL	800	100,000
"Accounted for" TOTAL	22,323,796	21,883,248
Lost or not accounted for:	2,025,056	2,437,752
"Lost" to air	51,300	30,000
"Lost" to East Fork Poplar Creek	238,944	470,000
"Lost" to New Hope Pond sediment - Chestnut Ridge	6,629	7,200
"Lost" to New Hope Pond sediments now in place	8,475	
"Lost" to ground, Building 9201-5 spill accident	49,853	
"Lost" to ground, 7 other spills	375,000	
"Lost" to ground, Building 81-10 operations	.3,000	
"Lost" TOTAL	733,201	557,053
Not accounted for:	1,291,855 ^a	1,880,699 ^a

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^aThe numbers are certainly not known to ± 1 lb; the reason for carrying the exact totals here is only to identify the specific numbers for accounting purposes.

Y-12 mercury material balance^a

Best estimate,
Mercury Task Force
June 20, 1983

Vouchered to Y-12	Accounted for:	Lost or not accounted for:	Not accounted for:
	Returned unopened or rebottled and stored/sold		
	In LiOH tails, sold and stored		
	In Building 9201-5 scrap, sold		
	In Building 9201-5 sludge, sold to "Mallory"		
	As flasking overage, "given" to GSA		
	In Building 9201-4 equipment, still in place		
	In sludges and sumps, Alpha-4		
	In Building 9201-2 sewer pipe, at ORNL		
	"Accounted for" TOTAL		
		2,025,056	1,291,855 ^a
		U	U
	"Lost" to air	2,437,752	1,880,699 ^a
	"Lost" to East Fork Poplar Creek	51,300	
	"Lost" to New Hope Pond sediment - Chestnut Ridge	30,000	
	"Lost" to New Hope Pond sediments now in place	238,944	
	"Lost" to ground, Building 9201-5 spill accident	6,629	
	"Lost" to ground, 7 other spills	8,475	
	"Lost" to ground, Building 81-10 operations	49,853	
	"Lost" TOTAL	375,000	
		3,000	
		733,201	1,557,053
		U	U

^aThe numbers are certainly not known to ± 1 lb; the reason for carrying the exact totals here is only to identify the specific numbers for accounting purposes.

bSecret, Confidential, or Unclassified in accordance with classification guidance.

development started in 1950, and production started in 1953 in Building 9204-4 and stopped in 1956. The process was less efficient than Colex, and it was therefore replaced.

Losses to water (i.e., East Fork Poplar Creek) are largely traceable to a process waste stream.

In the period before 1961, about 200,000 lb of mercury was discharged to the creek from the Colex waste stream as a very dilute (ppm of mercury), neutralized acid waste. The appearance of the waste stream carrying this mercury into the creek was that of an almost clear solution in the concentrations involved. Simulated solutions made up in the laboratory from neutralized mercuric nitrate appear clear and water-white, as would be expected since the solubility of mercuric oxide is 50 ppm and the concentrations discharged were less than this.

In 1963 and 1964 New Hope Pond was built to permit mixing and thus to even out the varying pH in the effluent from the Y-12 Plant. An unanticipated secondary benefit was the retention of substantial quantities of mercury-containing sediment. These sediments, as well as the continuing discharge of mercury since then, came from secondary sources of mercury, not from the aforementioned process waste stream that was improved in 1958 and finally discontinued in 1963. The secondary sources of mercury contamination are building drain systems, sewers, and lines connecting to the creek headwaters or Upper East Fork Poplar Creek. These lines contain mercury in some of the joints as well as contaminated sludges, etc., which continue to serve as a source for small amounts of mercury. Another 29,000 lb is estimated to have been lost to the creek from 1950 to 1983 from all sources other than the Colex process waste stream described earlier. The discharges to the creek are summarized in the following table:

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"Losses" (discharges) to East Fork Poplar Creek

Losses: Orex, Elex, Colex (1950-1954) (estimated)	11,000 lb
Losses: Colex waste stream (1955-1960) (measured)	199,500 lb
Losses: Colex metallic and bottom sludges (1955-1964) (estimated)	7,500 lb
Losses: Since 1961 (measured)	19,500 lb
Storm flow adjustment (estimated)	1,500 lb
TOTAL	239,000 lb

This estimate of 239,000 lb can be contrasted to the 470,000-lb estimate in the 1977 report mentioned earlier. The current figure is largely made up of the Colex waste stream measurement, 199,500 lb,

plus the 19,500 lb measured since 1961. That sum is 219,000 lb. It was derived directly from measured, historical data reported in Y-12 quarterly reports. In our 1977 report, the comparable estimate was 235,000 lb. At that time, it was erroneously concluded that the analytical procedures used over the years measured only the soluble mercury, and since it was well known that insoluble mercury was also present in the plant discharge, the 235,000-lb number was doubled. There were possibly two facts which understandably misled the authors of our 1977 report and caused them to come to this conclusion. At the time the report was prepared, the water samples from the creek were indeed being filtered and only soluble mercury was being measured. This practice was, however, only begun in January 1974, and prior to that time, the analyses produced numbers which included all the mercury in the sample, soluble plus insoluble. No explanation can now be found for why the procedure was changed in January 1974 to start filtering, but in June 1977 (the month the report was published), the practice was stopped. Another fact which may have been the source of further confusion is that the analytical procedure used in the period 1957 to 1959, when most of the mercury was discharged, did indeed call for filtration of all samples as a first step. However, the filtration was performed through a filter paper impregnated with cadmium sulfide and thus provided a means for removing all mercury, soluble and insoluble, from the sample to ensure measuring the total amount in the filter in subsequent steps. The bottom line is that it is now felt that the doubling of the 235,000 lb was not justified; it would be proper to double the quantity estimated discharged in the 3 1/2 year period of January 1974 to June 1977 (311 lb), but this does not appreciably affect the total estimate of 239,000 lb. It is the collective judgment of the Task Force, including those who actually developed the 1977 numbers, that the 239,000-lb number represents a sound and better estimate than the 470,000-lb number.

Now a more serious question about these losses arises from the concern over the adequacy of the sampling methods used throughout the years, not over the analyses themselves. There are two aspects of our concern. It is now known that mercury deposits on the walls of sample containers and that water samples should be acidified to preserve the initial concentrations. But a greater concern is whether quantities of mercury might have been discharged as either metallic mercury or in sludges containing adsorbed or metallic mercury which were very heavy and stayed on the bottom of the creek, thus not being picked up by the water samples taken from the surface or upper portion of the stream. In the 239,000-lb figure, an estimate was included of 7,500 lb from this source, but it cannot be documented.

In order to get some sort of check on the validity of the estimated loss to the creek, the Task Force has undertaken a limited sampling program in Watts Bar Lake and Chickamauga Lake to see if the evidence there is consistent with this figure or if those data might suggest that there were other sources of mercury lost to the water from

Y-12.* It has been estimated that 8,000 lb is contained in the floodplain and sediments of East Fork Poplar Creek.** The remainder (230,000 lb) presumably is in sediments in Poplar Creek, the Clinch, or in the remainder of Watts Bar and in the river system below. The initial form of the majority (80%) of the 239,000 lb was soluble or a very finely divided suspension of mercuric oxide, so it could well have been transported considerable distances. Mercury is adsorbed onto the fine particles of silt in the water and would settle very slowly and be resuspended readily. This is contrary to the notion suggested or implied sometimes in the media that since mercury is so dense, it will settle out readily. Experience with mercury contamination from chlor-alkali plants shows that mercury can be transported considerable distances (hundreds of miles) downstream.

One core of undisturbed bottom sediment was taken at the request of the Task Force by Oak Ridge National Laboratory (ORNL) personnel from Watts Bar Lake (45-ft water) approximately 8 miles above the dam (Mile 538.3). Analysis showed a sharp mercury peak in deposits laid down about the time of the Colex operation. The peak concentration of 7 ppm mercury was in a 1-in.-thick layer located 14 in. below the topmost sediment. The core was about 21 in. long and had root remains on the bottom, thus enabling a rough dating based on the assumption of uniform sediment deposition rates from the time of the initial flooding of the reservoir. The pattern for the fall-off of the mercury concentration in the years since deposition is not unlike those observed in sediments of Cherokee Lake in the ORNL study some years ago of the mercury contamination problems resulting from the operation of the chlor-alkali plant upstream in Saltville, Virginia.

Another core was taken farther upstream, but the entire sediment thickness was not penetrated by the core, and no mercury peak was found. Instead, concentrations increased gradually as depth through sediments increased. Further coring is under way with the objective of developing some independent check on the amount of mercury released to the environment through the East Fork of Poplar Creek. The results of analysis of these cores will guide plans for more detailed measurements if the cores indicate mercury loadings that are not consistent with the release estimate of 239,000 lb.

*At press time for this report only two cores have been analyzed, both from Watts Bar, and the data are presented in the next paragraphs. The coring equipment available did not allow full penetration of the sediment depth in one location, thus only one "good" data point is available. Longer coring equipment has now been acquired and several more cores will be taken in Watts Bar and some in Chickamauga. The mercury picture downriver must consider the impact of mercury discharges into the Hiwassee River by the chlor-alkali plant at Charleston.

**Assuming 40 ppm, 12 in. deep, 20 ft wide, 20 miles long, and 100-lb/ft³ density.

^tThe peak, however, is sharper and decreases more rapidly.

Questions have, of course, been raised also about the possibility of mercury contamination of Bear Creek, which rises at the west end of Y-12 and flows west down Bear Creek Valley. The Y-12 topography is such that drainage from the mercury processing areas involved in lithium separation would not affect Bear Creek. Sampling has shown no mercury in the waters of the creek nor in groundwater monitoring wells downgradient of the S-3 ponds. However, one sample did show contamination (13 ppm) of sediments close to the headwaters in the vicinity of the S-3 ponds. Recent sampling of groundwater from excavations nearby have shown mercury (100 ppb) in water believed to have been contaminated by seepage from the S-3 ponds. The source of mercury which in the past may have been and which now may be contaminating Bear Creek is a processing operation in which small quantities (a pound a month) of mercury have been (1950s) and is now (1983) used as a catalyst. This operation has nothing to do with the lithium cascade operations described in this report. Much effort is now under way to modify and correct the S-3 pond operation, and this contamination problem will be eliminated by those actions. Downstream sediment mercury levels in Bear Creek are satisfactory; levels are down to background at about 2 miles above its confluence with the East Fork of Poplar Creek.

Losses to land at Y-12 are summarized below:

Accidental process losses (8 spills)	425,000 lb
New Hope Pond sediment - current estimate	8,500 lb
Chestnut Ridge (New Hope Pond sediment)	6,600 lb
Lost to ground at 81-10	<u>3,000</u> lb
TOTAL	443,100 lb

This facet of the Task Force Study was developed largely from discussions with employees. Each of these spills involved loss of mercury to the ground. Recovery of metallic mercury spilled on the ground is very difficult, even with the procedures of digging the ground up and recovery by roasting. This was done in some cases. None of the many small spillages and leakages during plant operations and maintenance are included in this total since almost all of those were recovered and not lost to the environment. The spills number given above, 425,000 lb for eight incidents, can be contrasted with the five spills described in the 1977 report. In addition to those five, three other accidents were identified in this 1983 study which should properly be defined as process accidents/spills in which mercury was lost to the ground, and they are now included. The incidents were all in Building 9201-2, and the losses totaled 95,000 lb.

The New Hope Pond sediments data were estimated from core samples analyzed for mercury. In 1973, about ten years after the pond was constructed, the sediment levels had built up to the point where the dredging of sediments was necessary. The pond was dredged, and

sediment was removed to the top of Chestnut Ridge just to the south of the pond. The estimated mercury content of the removed sludge is 6,600 lb.

Building 81-10 was a shed containing a roasting furnace for recovery of mercury from sludges, wastes, dirt, etc. During those operations, some mercury was spilled on the concrete pad and on the ground. Core samples taken some years ago were used to develop the estimate shown here.

Environmental concern during Colex operations from 1955 to 1963 was focused on quantities of mercury lost to the creek (it was an expensive process material), with concentrations of mercury measured and reported quarterly beginning in 1954. Stream flows and thus total quantities of mercury were measured and reported beginning in the last quarter of 1955. Mercury releases were primarily an economic, not an environmental concern, since mercury was thought to be relatively harmless and nontoxic except in the vapor form. The possibility that mercury releases might constitute a much more serious problem was first publicized in the news media in March 1970 by a Canadian scientist who linked high concentrations of mercury in fish in Lake St. Clair to biological conversion of inorganic mercury to highly poisonous methylmercury. The attention thus focused on the methylmercury problem in 1970 was responsible for initiating widespread studies of mercury concentrations in fish as well as sediments, river water, etc., throughout the U.S. The first Y-12 study of mercury concentrations in East Fork Poplar Creek fish was done in 1970 and showed a range of 0.32 ppm to a high of 1.30 ppm. A comprehensive ORNL review in that same year surveyed fish from all over the U.S. and showed, for comparison, the mercury concentrations in fish from Pickwick Lake ranging up to 2.1 ppm and mercury concentrations in fish from the Holston River ranging to 4.4 ppm.

Several environmental studies have been conducted since 1970. The mercury studies done since the 1970 study by Merwyn Sanders of Y-12 include a study made in 1974 by an AEC-Oak Ridge Operations (ORO) employee, John Reece, who studied sediments in East Fork Poplar Creek and Bear Creek. In 1976 and 1977, J. W. Elwood of ORNL studied water, fish, and sediment from Poplar Creek and the Clinch River. The Gough sampling of mosses and liverworts was done in 1981, followed by the ORNL Van Winkle study of 1982, which examined fish and sediments in East Fork Poplar Creek. Ann Stiff of ORGDP studied fish from Poplar Creek in 1982.

The fish data have been generally consistent in showing higher-than-recommended [Food and Drug Administration (FDA): 1.0 ppm] levels in East Fork Poplar Creek fish, with lower concentrations in Poplar Creek and the Clinch River. Statistical analysis of the fish data for 1976 vs 1982 show no basis for believing mercury concentrations are either decreasing or increasing over this period at the junction of Poplar Creek and the Clinch or at the junction of the East Fork and Poplar Creek itself. Although there are a few fish in

each year's sampling which exceed 1 ppm, the averages are the controlling factor and are well below the FDA guideline.

In 1970, Merwyn Sanders (Y-12) found a maximum of 63 ppm mercury in sediments in ten samples. In 1974, John Reece (AEC-ORO) found a maximum of 72 ppm and an average of 19 ppm in 16 samples. W. Van Winkle (ORNL) found a maximum of 127 ppm in his 1982 study. And one sample from the "Gibson" Illinois Avenue/Turnpike property ran 480 ppm. These data do not support a conclusion that sediment concentrations are increasing with time. The concentrations depend a great deal on sediment particle size, and it was not until the recent studies that this was properly recognized.

Putting these data in proper perspective is difficult from a technical standpoint. Survey and review articles on mercury in the environment over the years present instances of fish data, water data, and sediment data having even higher concentrations in other locations in the U.S. The problem with East Fork Poplar Creek is somewhat unusual in that most other mercury discharges have been to much larger streams or to rivers. However, the relevant question is, "What (if any) health risk problems do the past or current discharge pose today?" The risks from the East Fork Poplar Creek water and sediment contamination are so low that they are very hard to quantify. In this study, the only target population thought to be in any way at risk is persons who continuously eat East Fork Poplar Creek fish, which in some cases concentrate mercury to levels higher than that recommended by the FDA (1.0 ppm at present stream levels). However, the small fish population makes it unlikely, though not impossible, for a person to take in dangerous quantities of methylmercury.

CURRENT ASSESSMENT

The current situation on discharges to East Fork Poplar Creek is monitored by taking samples of the outflow of New Hope Pond. "Grab" samples are taken every Monday morning, and a "composite" sample is taken on a flow-proportional basis throughout the week. Over the 24-month period from 1981 through 1982, the overall average concentration was 1.3 ppb versus the interim drinking water standard of 2.0 ppb set by the EPA in 1976. This 1.3 ppb is higher than the stream water quality guideline of 0.05 ppb set by the state of Tennessee. That level is used for streams containing fish that are caught and eaten, and it allows for the natural process of concentration of mercury by a factor of 10,000 times by fish with a resulting flesh concentration still within the FDA-recommended level of 1.0 ppm. Taking flows into account, over these two years 64 lb of mercury were released, an average of 1.4 oz per day, or 39 g per day. Almost all (greater than 90%) is suspended or insoluble mercury.

Material balance studies have been done during the last year to find out where this mercury originates. Pipes feeding water into the creek headwaters that flow into New Hope Pond were sampled and flow measured. The effluent pipes from Buildings 9204-4 and 9201-5 together contribute about 47%, the pipes from 9201-4 contribute about 44%, and

the pipes from 9201-2 contributed about 8% of the mercury entering New Hope Pond during a careful two-day study in December 1982. The pond effluent on those days was 42 g, and about 100 g (71%) was retained in the New Hope Pond basin.

In the last few months, there has been an active program to identify and clean up the secondary mercury sources: the Building 81-10 mercury recovery area; the sumps of Buildings 9201-4, 9201-5, and 9201-2; drain lines; and storm sewers. This cleanup activity has stirred up sediments in pipes and lines and has resulted in creek mercury concentrations that are temporarily about 5 times higher than the levels of 1981-1982. It is, of course, expected that when these operations are complete, the mercury levels in the creek will drop below the 1981-1982 levels.

In addition, Y-12 is undertaking subsurface studies to determine whether mercury accumulations can be detected below sites of major spills or operating buildings. A further objective is to find out whether there is any significant contamination of groundwater from those past losses. Further studies under way include a study of the Chestnut Ridge site, used for storage of sediment dredged from the New Hope Pond in 1972, to see whether it is contaminating groundwater. In addition, many other analytical and engineering studies are under way in support of the DOE/EPA/State Memorandum of Understanding on Y-12.

CONCLUSIONS

Worker health was clearly an active concern of both AEC and Y-12 managers in the period of Colex operations from 1955 to 1963. During the start-up period of 1955, much higher concentrations of mercury vapor in the workplace air were experienced than were desired, and a major effort was required to reduce them to acceptable levels. This effort was successful early in 1956, and operational levels for the next seven years were acceptable. No effects of chronic mercurialism were found in a 1974 follow-up study of those workers who had shown the highest mercury urinalysis values. A 1983 epidemiology study by ORAU found no significant differences between Y-12 mercury workers and Y-12 nonmercury workers and a U.S. general population group in the death rates from all causes or from a number of different kinds of cancer.

Material accountability has been restudied in an effort to develop the best estimate of the mercury material balance. There are a number of increases and decreases from the 1977 Y-12 report, and those differences have been reconciled. The combined "lost" and unaccounted-for mercury total is 2.0 million lb rather than 2.4 million lb. Of the 2.0 million lb, 0.7 million lb was "lost" from our control to air, water, and land, leaving 1.3 million lb that is unaccounted for using the 1977 accounting system. Although it cannot be documented, it is the Task Force opinion that a sizable part (0.5 million lb) of this unaccounted-for mercury was never received by Y-12, and good guesses can be made as to the disposition of another 0.15 million lb, leaving a net unaccounted-for estimate of 0.65 million lb.

Environmental concerns in the Colex operations were focused on the quantity of mercury discharged, and these releases were monitored beginning in 1954. The quantities released and their origins have been detailed in the present studies. The source and nature of most of the discharge to the creek is known. The majority of the mercury was discharged in a very dilute process waste stream (not as metallic mercury) between 1956 and 1959. In 1958 changes were made in the process to reduce these losses significantly. The quantities released recently, 1981 and 1982, average 1.4 oz per day (1.3 ppb), and a program continues at Y-12 to reduce further the sources responsible for this contamination. Studies are under way using drilling techniques to try to determine the current location of mercury lost to the ground in Colex accidental spills as well as studies concerning the contamination and the implications thereof in the East Fork Poplar Creek floodplain.

Available data support the judgment that there is no immediate or foreseeable risk to the health of the public as a result of the past or current mercury discharges other than an unlikely possibility of harm that would result if a person were to ingest a large number of fish containing higher than 1 ppm mercury from the East Fork Poplar Creek on a continuing basis. And even this low-probability situation will be diminished and eventually eliminated as soon as the outflow from the Y-12 plant ceases to contain the small amount of mercury being discharged from secondary sources of contamination.



1. HISTORY OF LITHIUM ISOTOPE SEPARATION AT Y-12



1. HISTORY OF LITHIUM ISOTOPE SEPARATION AT Y-12

1.1 BACKGROUND

In the early 1950s, a massive national effort was undertaken to develop thermonuclear fusion weapons. Unlike earlier fission bombs that derived their energy from the splitting of uranium atoms, these new weapons obtained their energy from the combination (or fusion) of heavy hydrogen atoms into heavier atoms. For this reason, they became commonly known as hydrogen bombs.

The chemical compound lithium deuteride is an excellent form of hydrogen fuel for use in fusion bombs, having desirable density and machineability characteristics. Furthermore, a certain isotope of lithium, ^6Li , will combine (or fuse) in a thermonuclear explosion and give that explosion additional energy. Natural lithium contains about 7% of the isotope ^6Li ; the remainder is ^7Li , which is inert in a thermonuclear explosion. In the 1950s, a decision was made to separate high-purity ^6Li from natural lithium and to use this ^6Li to produce lithium-6 deuteride for use in more powerful and efficient weapons. The Y-12 Plant in Oak Ridge was given the assignment to develop, design, construct, and operate a production process to accomplish this task.

1.2 THE LITHIUM ISOTOPE SEPARATION PROCESS

The separation of lithium isotopes on an industrial scale is based on the fact that, under certain conditions, the ^6Li isotope will dissolve more readily in mercury than will the ^7Li isotope. Lithium dissolved in mercury solvent is referred to as lithium amalgam and will remain in a stable state in contact with an aqueous solution only if an electric current is applied to the mixture. If this current is removed, the amalgam will decompose and the lithium will react with the water.

If lithium amalgam is allowed to flow in contact with a fluid containing another lithium compound, the ^6Li atoms will migrate to the amalgam and the ^7Li atoms to the lithium compound in the fluid. This is "two-phase, countercurrent, liquid-liquid exchange." The most productive compound and fluid used in this isotope separation process is lithium hydroxide dissolved in water.

Some work was done by the Oak Ridge National Laboratory (ORNL) in 1951 and 1952 on an organic solvent to take the place of water. This was known as the organic exchange (or Orex) process. The Orex process was not pursued past the pilot plant stage.

All two-phase, countercurrent exchange systems have certain basic components in common. They all have: (1) a waste-end reflux system that makes possible the removal of most of the desired constituent from the material which is to be discarded, (2) a rectification system in which the effect of a normally rather small unit separation factor is multiplied manyfold, and (3) a product-end reflux system that makes

1. amalgam-maker / absorber tray
2. cascade (separation column)
3. decomposer

possible the concentrating of the desired constituent to the required level of purity. The following paragraphs describe the way each of these elements was implemented at the Y-12 Plant to accomplish lithium isotope separation.

The waste-end reflux device (also called an amalgam maker) was a shallow tray through which mercury and an aqueous solution of lithium hydroxide flowed together under the influence of gravity and without deliberate mixing. The bottom of the tray, with which the mercury was in contact, was [REDACTED], while in the aqueous phase [REDACTED] plates were positioned parallel to the bottom of the tray [REDACTED] just above the mercury layer so that no electrical contact would be made. When a direct electrical current charged [REDACTED] plates in the aqueous phase positively and the tray bottoms under the mercury negatively, lithium ions were discharged at the mercury surface and the lithium dissolved in the mercury to form an amalgam. This was the amalgam that then exchanged with the aqueous solution of lithium hydroxide in the rectification section. The design of these amalgam-producing trays was similar to trays used to produce an amalgam from sodium chloride in one common type of chlorine-producing apparatus. Because the amalgam output of these trays had to equal the total amalgam flow in the rectification section of the separation plants, very large quantities of power were consumed in the amalgam makers for the production plants.

A major piece of apparatus in the waste-end refluxor was an evaporator. Because the aqueous lithium hydroxide solution that flowed through the amalgam makers was depleted in lithium by the amount that was transferred into the amalgam, this solution had to be continuously reconcentrated by evaporation. The quantity of water that had to be removed by evaporation was equal to the amount flowing through the cascade. This called for a very large evaporator, [REDACTED]

[REDACTED]
The waste stream from the waste-end refluxor of the Y-12 processes typically had a ^{7}Li concentration of [REDACTED]. This waste stream is referred to as tails and was also called "extract" in the project literature. The amount of lithium in the tails was almost as great as that in the feed. The tails solution would commonly be evaporated to produce lithium hydroxide monohydrate, which was then a normal item in commerce. Such lithium hydroxide was identifiable because it was depleted in ^{6}Li and was contaminated with traces of mercury that were extremely difficult to remove.

In isotope separating plants, the system in which the separation actually takes place is the rectification system, commonly called a cascade. In the lithium isotope separations plant, the cascade section provided for countercurrent flow and intimate contact between the aqueous lithium hydroxide and lithium amalgam. Two distinct types of rectifying devices were used in the Y-12 Plant. The first used [REDACTED] to provide contact between the amalgam and aqueous phases and was commonly called the electrical exchange (or Elex) process. This plant operated in a satisfactory manner and produced very significant quantities of high-concentration ^{6}Li . A

second process employed the much more efficient packed column as the contacting device. This was known as the column exchange (or Colex) process. These columns consisted of steel tubes 50-ft high filled with steel Raschig rings. As the amalgam flowed down from the top of the columns by gravity, the aqueous lithium hydroxide percolated upward through the amalgam. The rings served to provide a large surface area to ensure adequate contact between the two phases.

At the product end of the cascade, there was a reflux device that transferred the lithium from the amalgam phase leaving that end of the cascade to an aqueous phase. This device was called a decomposer because it caused decomposition of the amalgam, with the lithium reacting with water introduced into the bottom of the decomposer to form lithium hydroxide and hydrogen. A decomposer was a vertical column filled with crushed graphite. The amalgam flowed down over the graphite, ~~and the water pereolated up through it.~~ Mercury, free of lithium, flowed from the bottom of the decomposer, and an aqueous lithium hydroxide flowed from the top. The mercury was pumped back to the amalgam makers, and the aqueous effluent, which contained the ^{6}Li product, was sent back to the cascade. When the ^{6}Li concentration reached the desired level, some of this stream was removed as product. In contrast with the cascade columns, decomposers were short and fat because the decomposition of the amalgam was accompanied by the generation of very large volumes of hydrogen, and this gas had to be effectively separated from the process solutions. The graphite used to pack decomposers was of a special grade, hard enough that it was not rapidly eroded and high in purity.

A great deal of auxiliary equipment was required for the running of lithium isotope separation plants at Y-12. The pumps were the most important items of auxiliary equipment. The plant for the Elex process was designed so that an amalgam would not have to be pumped; it flowed by gravity from the time the mercury entered the amalgam makers until it left the decomposer. A simple centrifugal pump was adequate to return the mercury to the top of the plant. Simple centrifugal pumps were also adequate for all aqueous service in this plant. In the Colex process, all of the columns were on one level so that the aqueous phase leaving the top of one column had to be pumped into the bottom of the next column against a head of 50 ft of amalgam aqueous mixture. The amalgam leaving the bottom of the column had to be pumped to the top of its next column. For the 50-ft columns and the large flow rates employed in the Y-12 Plant, these functions required very special pumps. The total power input to the pumps was a large fraction of the power input to the amalgam makers.

A demineralizer was also an important component of the lithium separation plants. The success of the plants was governed in considerable measure by the ability to keep the system free of contaminants. Ideally, there should have been nothing circulating in the system except water, mercury, and lithium hydroxide. Impurities such as sodium and potassium normally present in the lithium feedstock would concentrate at the product end, causing a contamination of the product. In addition, certain impurities, when present in trace amounts, could cause an increase in the rate of decomposition of the

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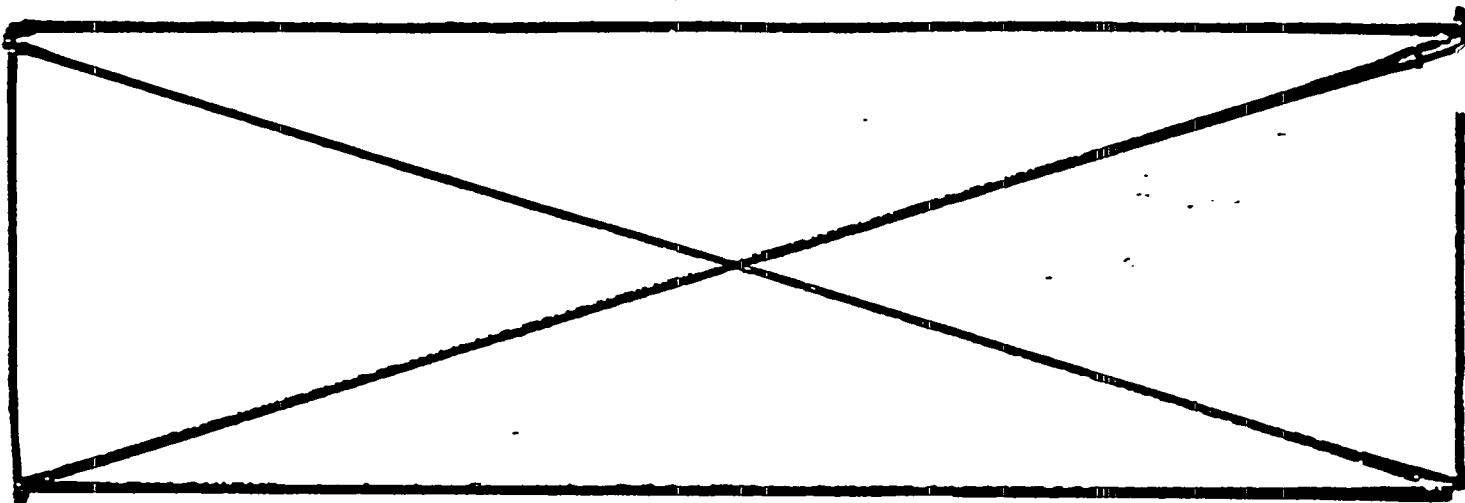
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Hg losses?

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A demineralizer was also an important component of the lithium separation plants. [REDACTED]

[REDACTED]. Ideally, there should have been nothing circulating in the system except water, mercury, and lithium hydroxide. Impurities such as sodium and potassium normally present in the lithium feedstock would concentrate at the product end, causing a contamination of the product. [REDACTED]



[REDACTED] The cleaning method involved washing the mercury with a water-nitric acid solution. This acid dissolved the impurities as well as some mercury. The acid wash was then discarded and eventually made its way to the creek. Details may be found in Section 4. Significant amounts of soluble mercury losses occurred from this cleaning operation from August 1956 through June 1958.

Additional process improvement studies were conducted in 1958-1959 to further eliminate the loss of mercury from the wash operation. [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED] therefore, the mercury losses from the mercury cleaning operation were essentially eliminated.

While the losses from this operation do not account for all of the soluble mercury leaving the plant, the process change resulted in significant reduction in the losses to the waters leaving the plant.

1.3 PILOT PLANTS

As previously mentioned, three different lithium isotope separation methods were investigated at Y-12: Orex, Elex, and Colex. A number of buildings at Y-12 were used to house pilot plants for research on these separation processes. These buildings, as well as others used in the lithium isotope separation program, are shown in Figure 1.1.

1.3.1 Orex Pilot Plant Facilities

Building 9733-1 was operated in 1951 and 1952 by ORNL as a development facility for the Orex process. This facility had a steel sump or trap installed in the floor drain system to remove any mercury from water flows before entering the storm sewer. This trap was routinely checked for mercury and emptied. This system was incorporated on all future development and pilot facilities. In the case of Building 9733-1, it proved effective in preventing metallic mercury from entering the creek. Building 9202 was also used as a pilot plant for the Orex process between April 1953 and May 1954.

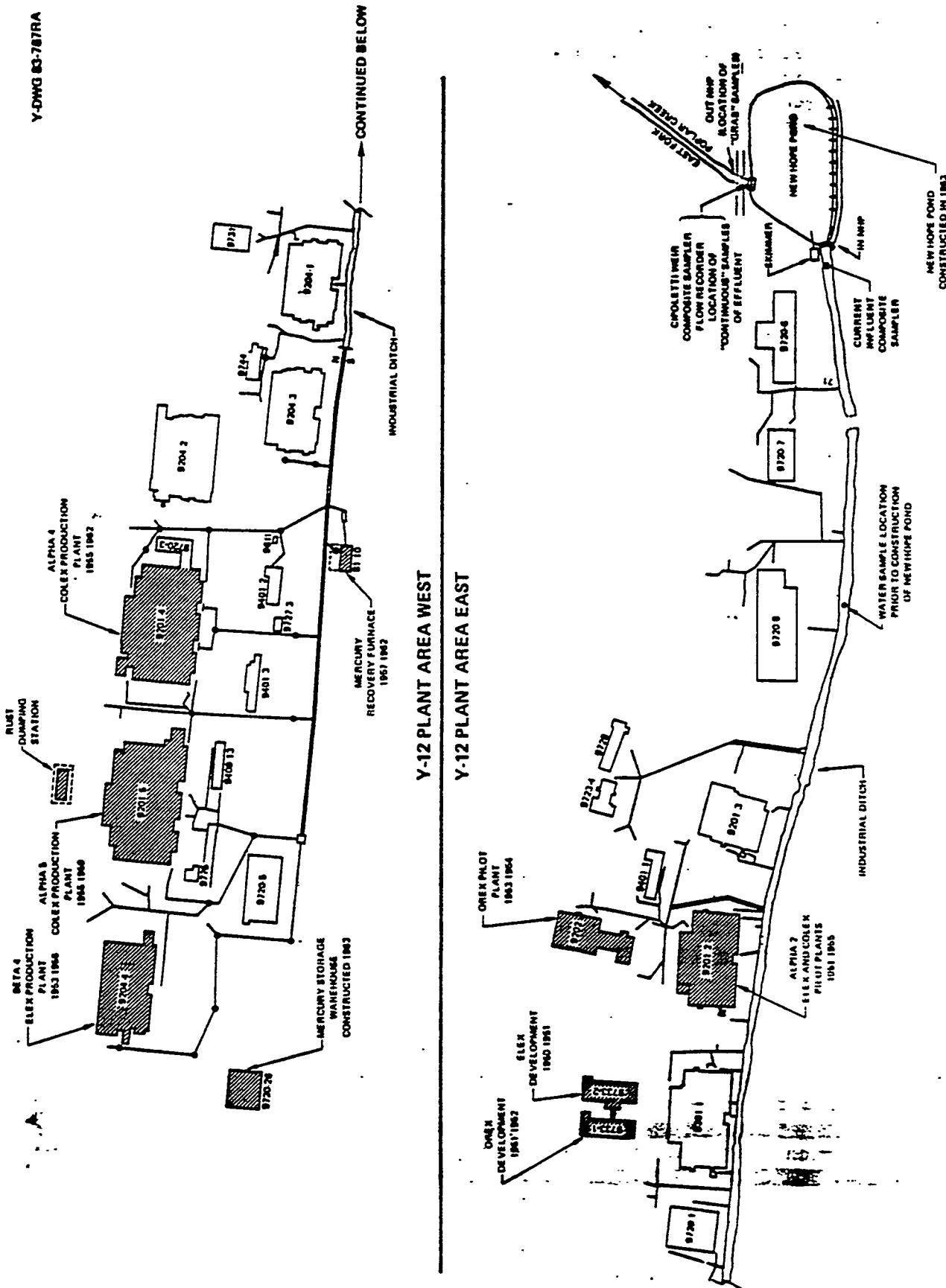


Fig. 1.1. Lithium Isotope separation facilities, Y-12 Plant, 1950 - 1963.

1.3.2 Elex Pilot Plant Facilities

Building 9733-2 and Building 9201-2 (Alpha-2) were used for Elex process development in 1950 and 1951. The facilities constructed were tabletop-size laboratory experiments occupying a few rooms of these general-purpose laboratory buildings.

1.3.3 Colex Pilot Plant Facilities

The Alpha-2 building was used from September 1952 through 1955 in Colex development activities. Several major Colex pilot plants were built and operated: [REDACTED] multicolumn, [REDACTED] single column, [REDACTED] pump-testing facility, and a [REDACTED] multicolumn test facility. The height of the columns varied [REDACTED]
[REDACTED]

1.4 PRODUCTION PLANTS

Three individual lithium isotope separation plants were operated at Y-12 in the ten-year period between August 1953 and May 1963 (see Fig. 1.2). The first of these was an Elex plant located in the 9204-4 processing building. The other two were Colex process plants and were located in the 9201-4 and 9201-5 buildings. Each of these will now be described in turn.

1.4.1 Building 9204-4 (Beta-4)

The Beta-4 Elex plant contained two large tapered cascades that were serviced by a common group of auxiliary systems (see Fig. 1.3). A division was made into two separate cascades for the following two reasons: (1) to fit the area and floor plan of a previously constructed building and (2) to provide a measure of safety for continuous operation by having two separate enriching facilities. Each cascade may be thought of as containing three sections. The amalgam maker or absorber section was located [REDACTED] in the cascade and contained the facilities by which the lithium was plated out of the aqueous phase and into the mercury. [REDACTED]

[REDACTED]. The largest section contained the reactors where the isotopic separation of ${}^6\text{Li}$ from ${}^7\text{Li}$ took place. Here the amalgam and aqueous phases flowed countercurrently. To keep the amalgam from decomposing, a low direct current was applied between the two phases, [REDACTED]

[REDACTED]. The basic exchange unit for the absorber and reactor sections was a tray [REDACTED]

[REDACTED]. Each tray was mounted in a level position [REDACTED]

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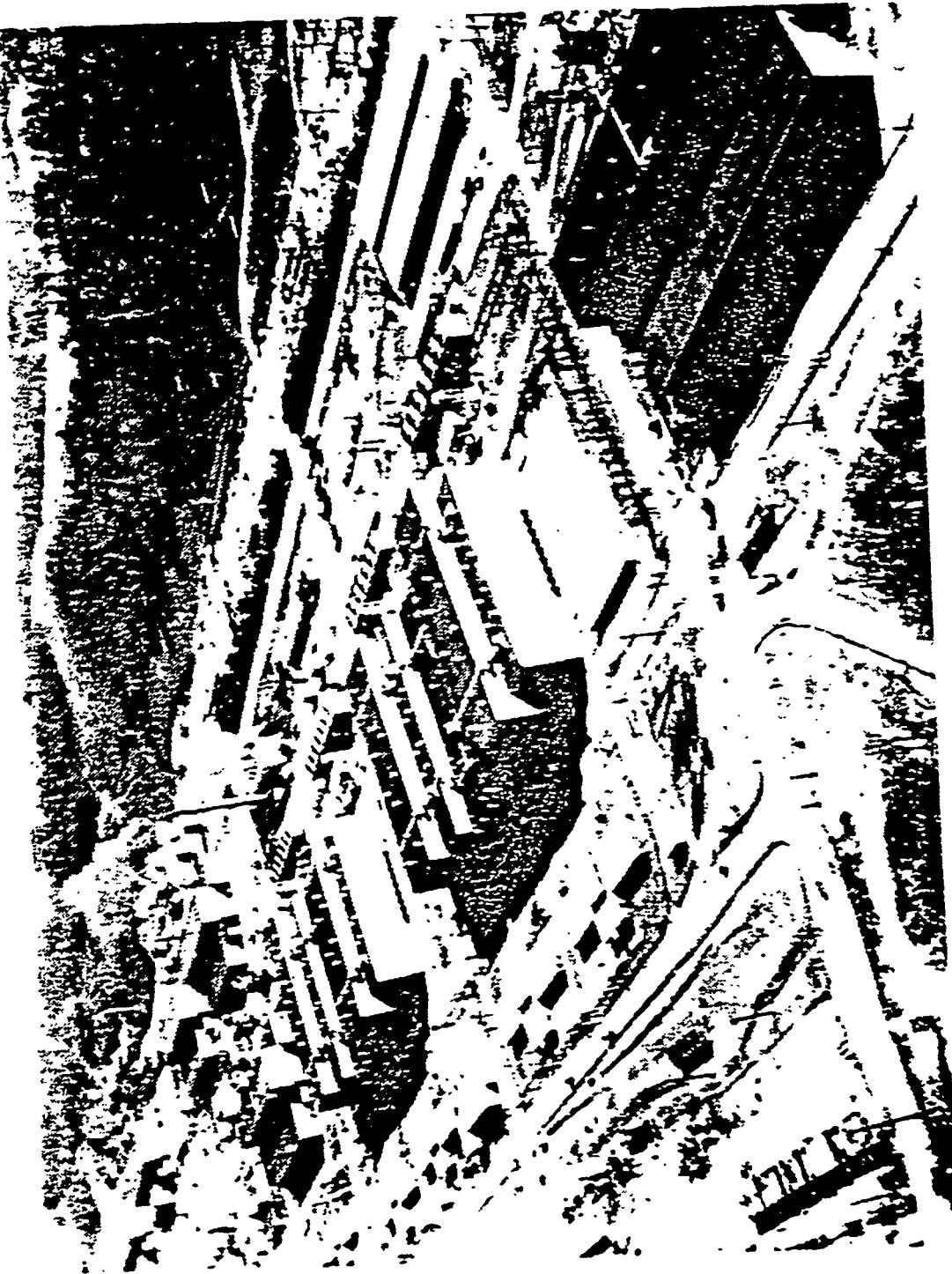


Fig. 1.2. Buildings at the west end of the Y-12 Plant which housed lithium isotope separation facilities. (From right to left are Beta-4, Alpha-5, and Alpha-4. The buildings beyond Alpha-4 in the photo were used for other purposes.)

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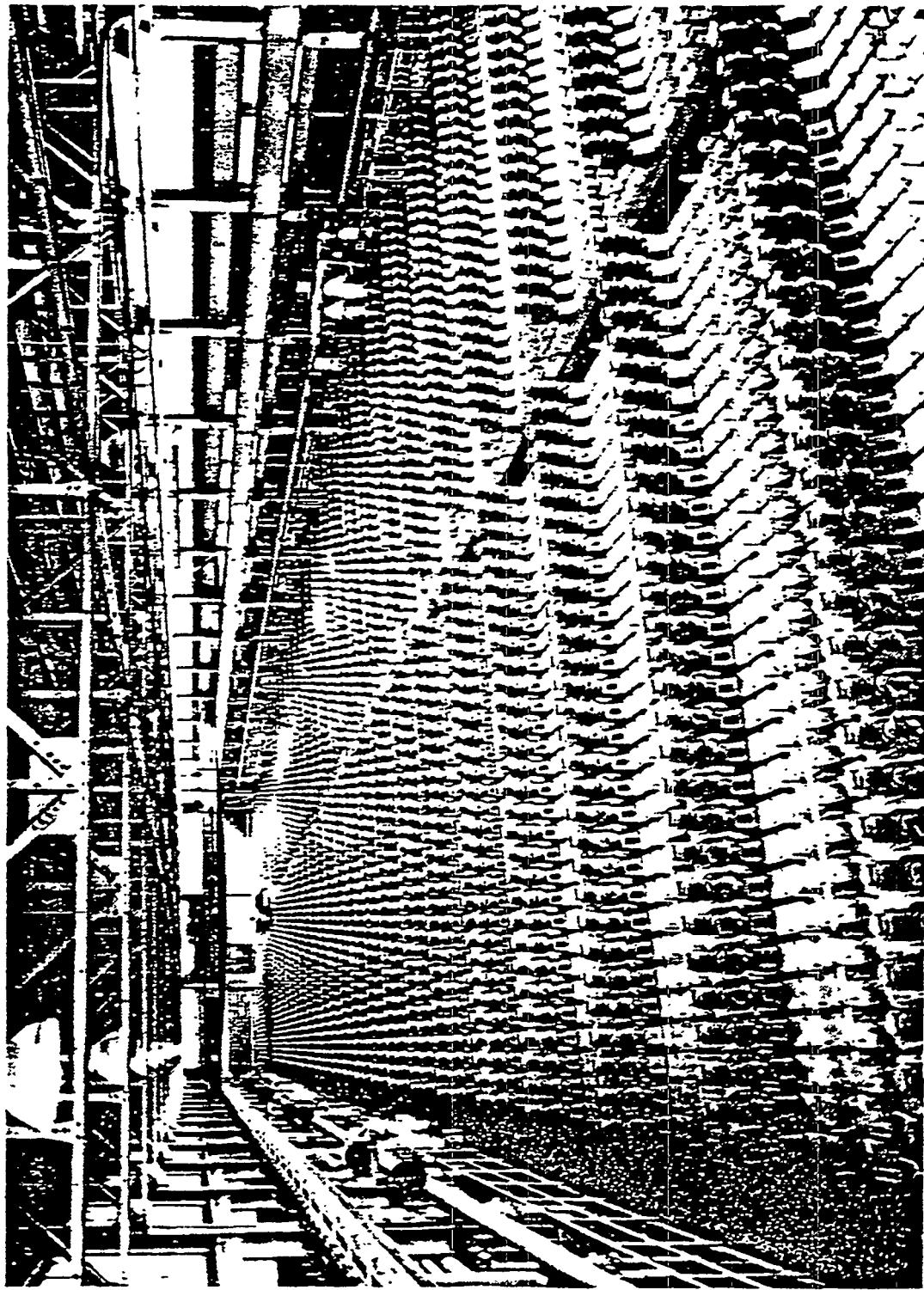


Fig. 1.3. Partial view of an Elex cascade. [REDACTED]
(ca. 1955 photo)

In the absorber [REDACTED] of each cascade, 30 trays were located side by side and narrowed down to 2 trays [REDACTED]

[REDACTED], with the varying lengths of the lines thus formed providing the necessary taper to the cascade. [REDACTED]

[REDACTED]. At the end of each tray, [REDACTED]

[REDACTED] each tray was covered with two assemblies called bonnets, each of which was 10 ft long. [REDACTED]

The mercury solvent system provided for the collection of mercury from the trays, the purification of that mercury, and its return to the trays. The main equipment in the mercury solvent system consisted of storage tanks, ten large pumps, and three scrubbing towers. During the Elex plant start-up, the trays in the solvent system were filled with mercury that was to be pumped through the Elex cascade [REDACTED]. The originally installed mercury pumping system was found to be inadequate to accomplish this task and had to be rebuilt according to new specifications. Other important auxiliary equipment found in the Elex system included an evaporator [REDACTED] purification system, an extract system, a demineralizer system, and a chemical recovery system.

1.4.2 Building 9201-5 (Alpha-5)*

The Alpha-5 Colex plant was the next lithium isotope separation plant built at Y-12 (see Fig. 1.4). It was constructed by a "crash effort" requiring only 15 months, and operation start-up commenced in January 1955. The Alpha-5 plant incorporated a modification of the Elex process. Vertical columns replaced the horizontal trays of the Elex system. In these columns, a mercury lithium amalgam [REDACTED]

[REDACTED] Again, the ^6Li isotope migrated in the direction of the amalgam flow, and the ^7Li isotope migrated with the aqueous flow.

*The Colex construction project included both 9201-4 and 9201-5. The total project cost was \$232,881,727. For further details, see the footnote to Section 2.4.1.

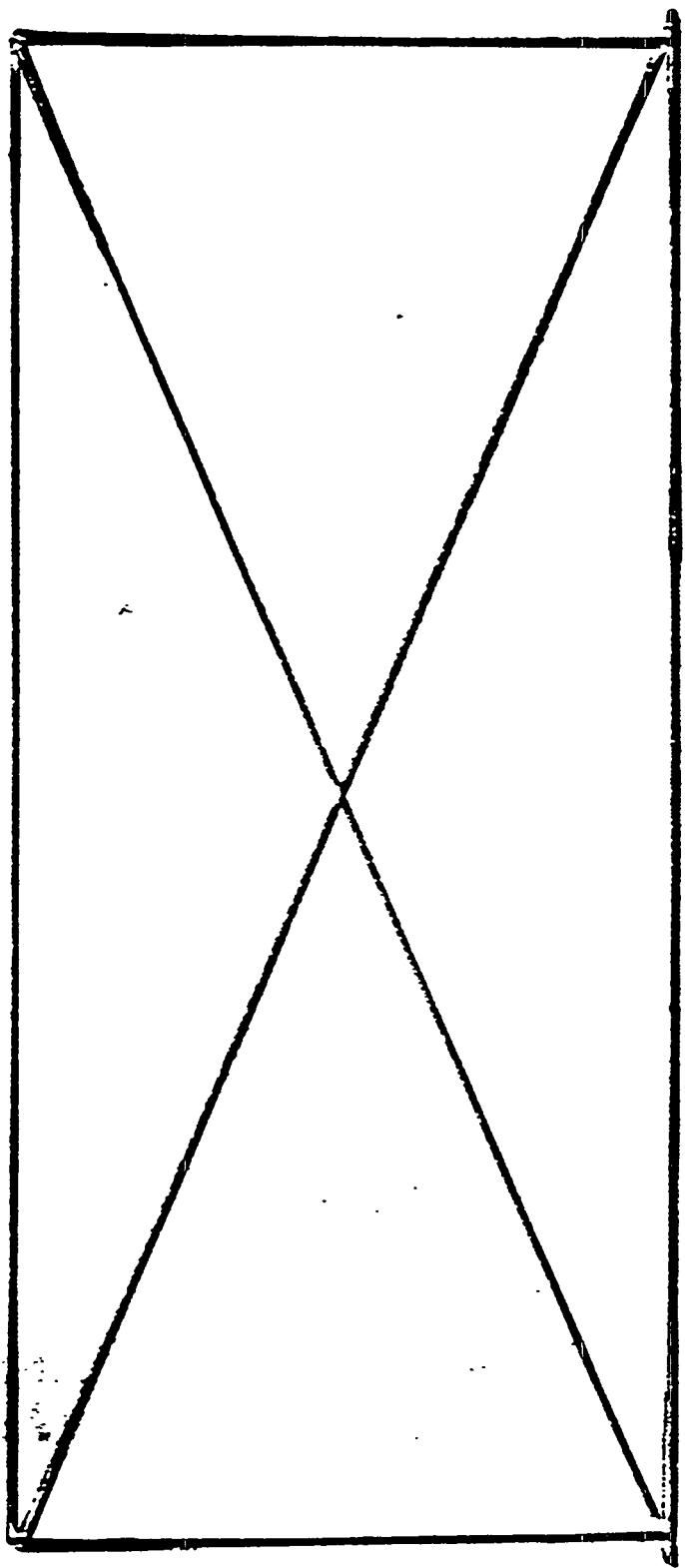


Fig. 1.4. Schematic of Colex cascade layout in Alpha-6.

There were two significant differences in the Alpha-5 Colex plant when compared with the Beta-4 Elex plant.

Second, the solvent system in the Colex process had to pump [REDACTED]

For these reasons, new pumps were designed and developed that could handle the pumping [REDACTED]

The Alpha-5 Colex plant had [REDACTED] separation cascades. Each separation cascade [REDACTED] followed by a decomposer column. Each cascade received its lithium mercury amalgam from [REDACTED] absorber trays [REDACTED]. Each tray was a large-scale, continuous mercury electrolytic cell. Each tray was [REDACTED] thus each amalgam tray [REDACTED] cascades [REDACTED]. [REDACTED] motor generator sets to power the amalgam trays, and the combined capacities of these generator sets totaled [REDACTED].

[REDACTED] cascades shared a common mercury-purification system. The mercury pumping system within the Alpha-5 Colex plant was capable of pumping [REDACTED] to [REDACTED] cascades for a total flow rate [REDACTED], or [REDACTED] for the Alpha-5 facility. This flow rate was maintained three shifts per day, seven days per week, for a number of years. When Alpha-5 and Alpha-4 were both operating, the total mercury pumped each day was [REDACTED]. During the operating life of these two plants, the total mercury pumped was [REDACTED] lb. A corresponding water flow system provided a flow rate [REDACTED] for a total flow rate of [REDACTED] of water. Other auxiliary systems found in the Alpha-5 Colex plant were a feed dissolving and purification system, an evaporator system, a water demineralizer, an extraction system, a refrigeration system, and a chemical recovery system (see Figs. 1.6 through 1.9).

1.4.3 Building 9201-4 (Alpha-4)

The Alpha-4 Colex plant was brought on-stream in June 1955, soon after the Alpha-5 Colex plant. This Colex plant [REDACTED] cascades [REDACTED] columns each.

[REDACTED] The mercury pumping system in the Alpha-4 Colex plant was roughly [REDACTED] for [REDACTED] cascades for a total flow rate of over [REDACTED] of mercury, or almost [REDACTED] for the Alpha-4 facility. The water pumping system was [REDACTED] providing a total flow rate of over [REDACTED].

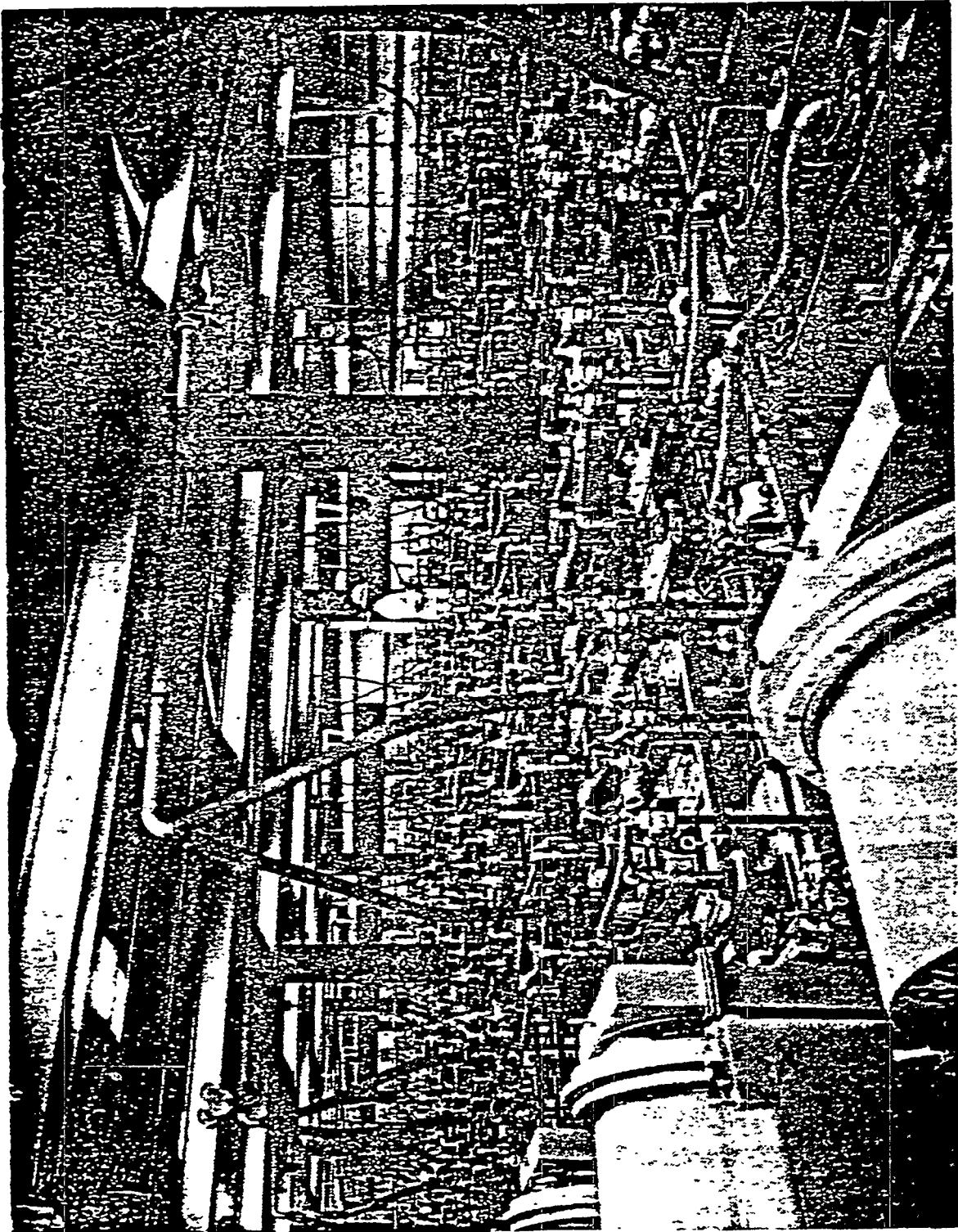
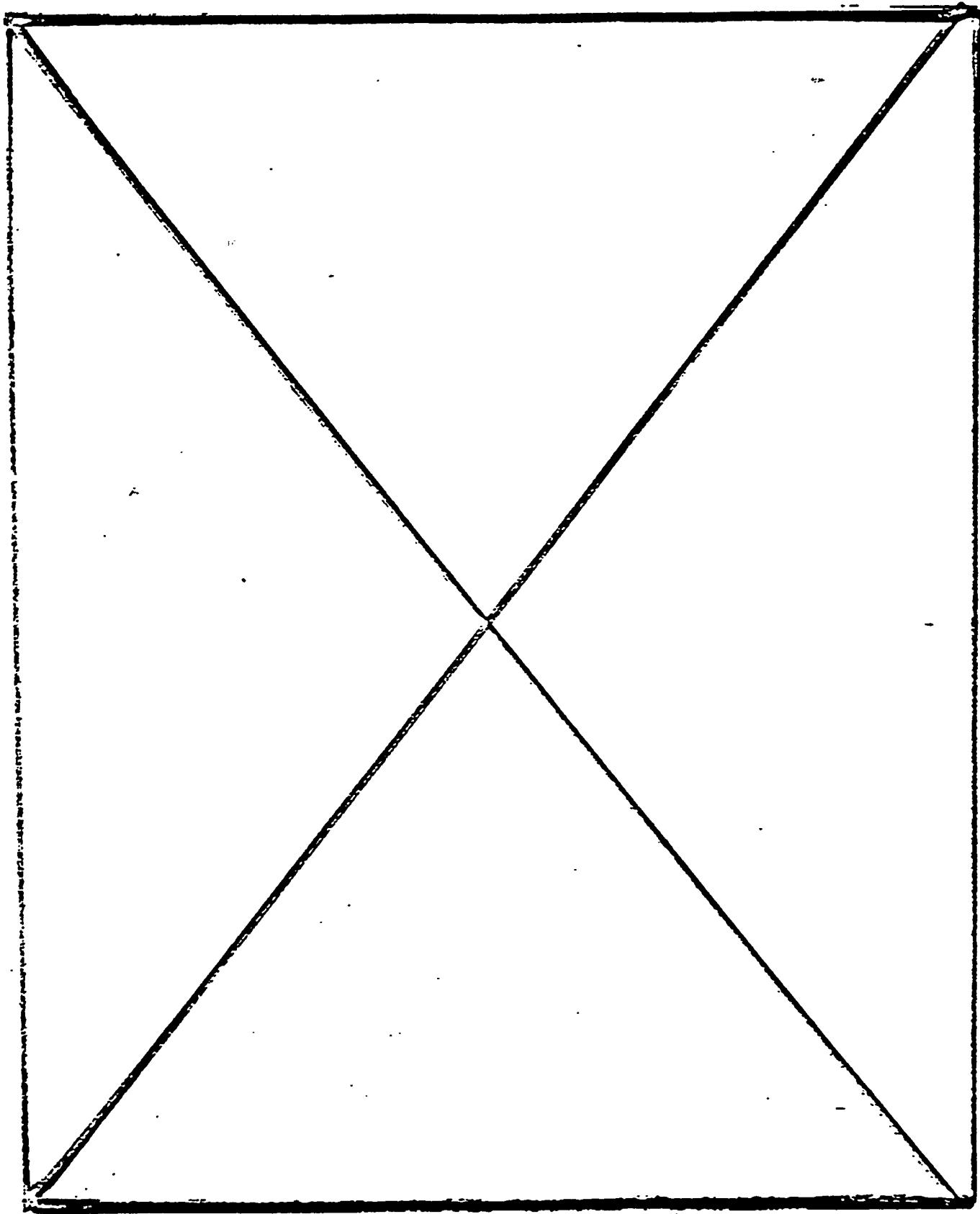
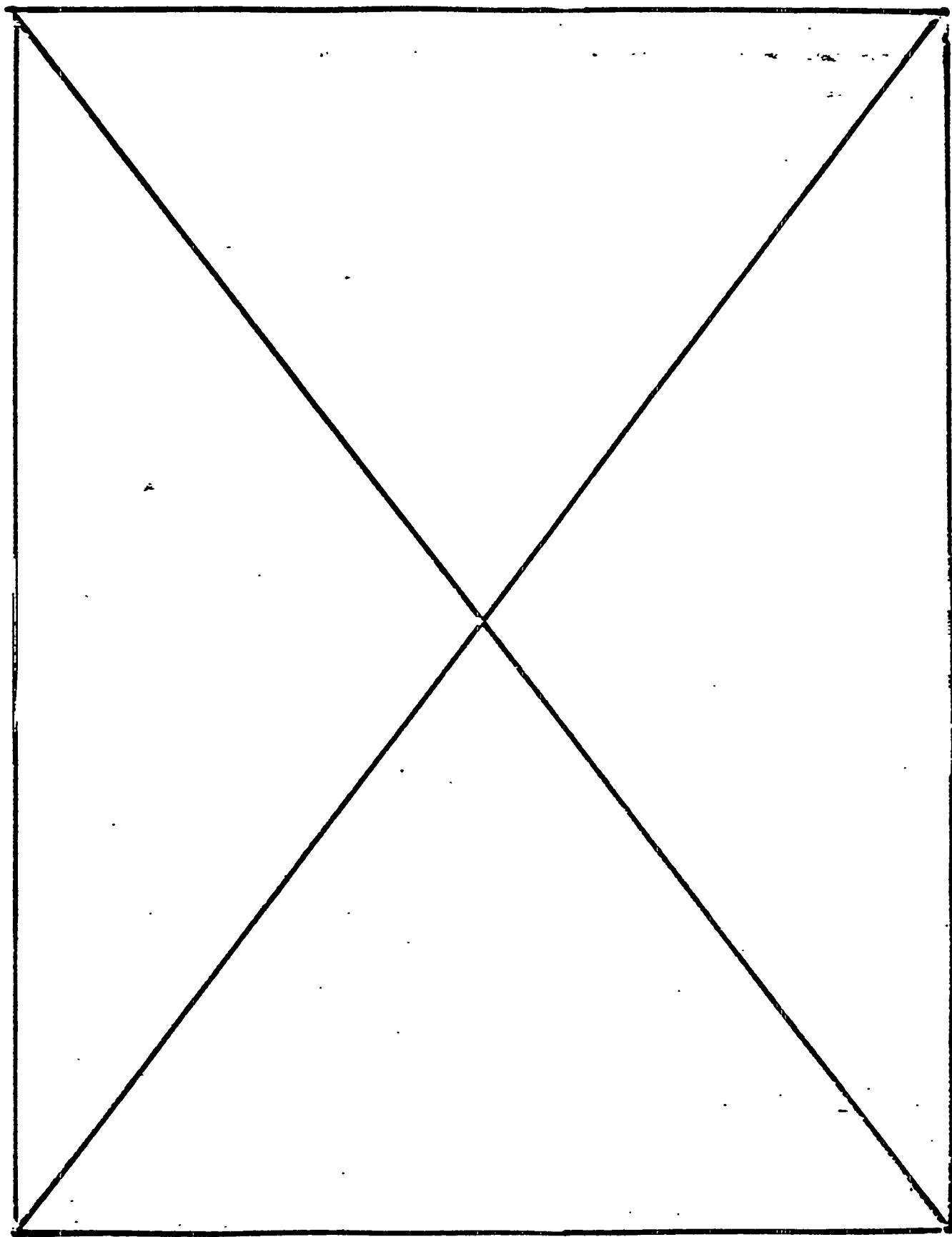
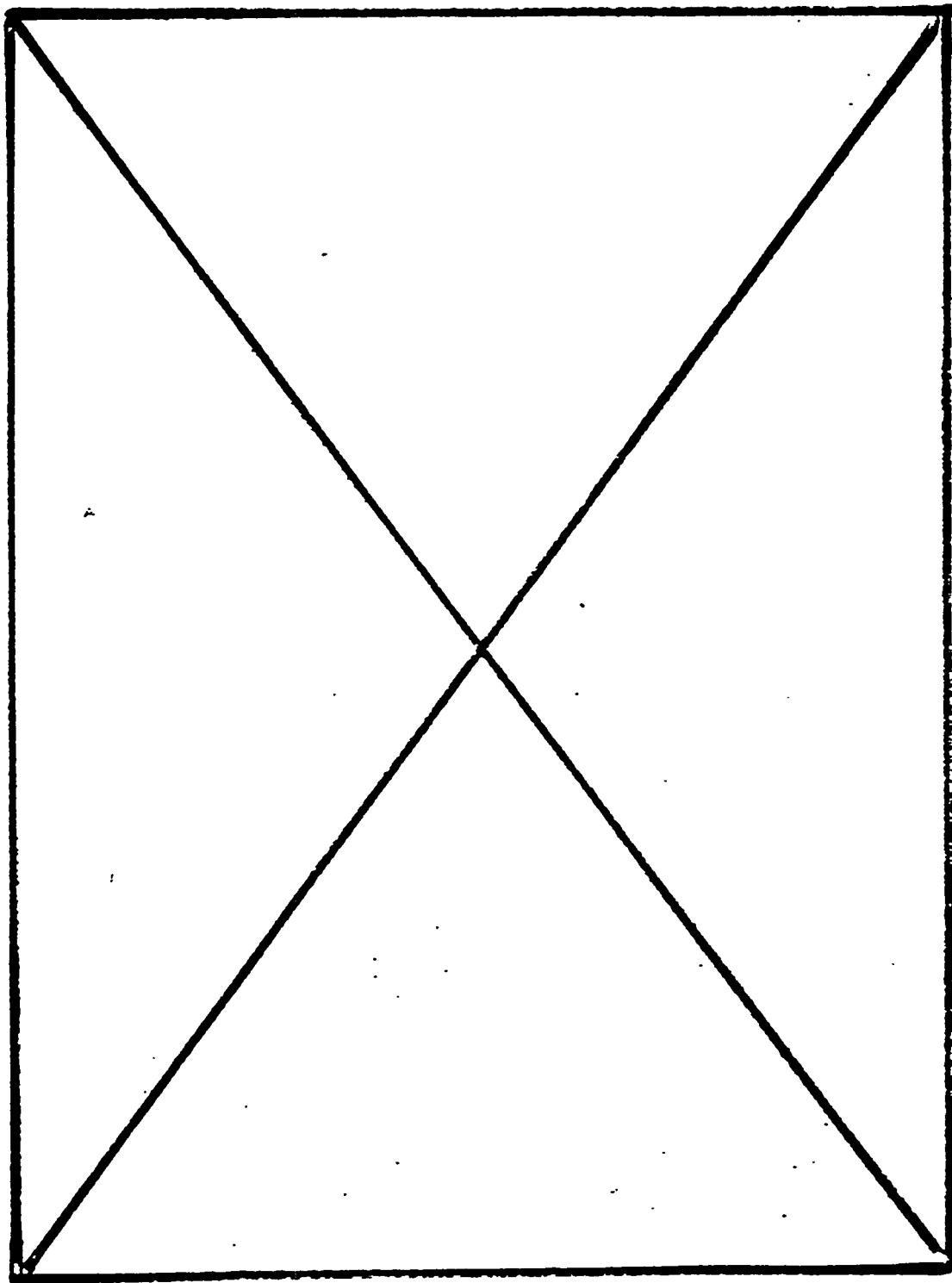


Fig. 1.5. Amalgam-maker trays in Colex cascade.
(1955 photo)







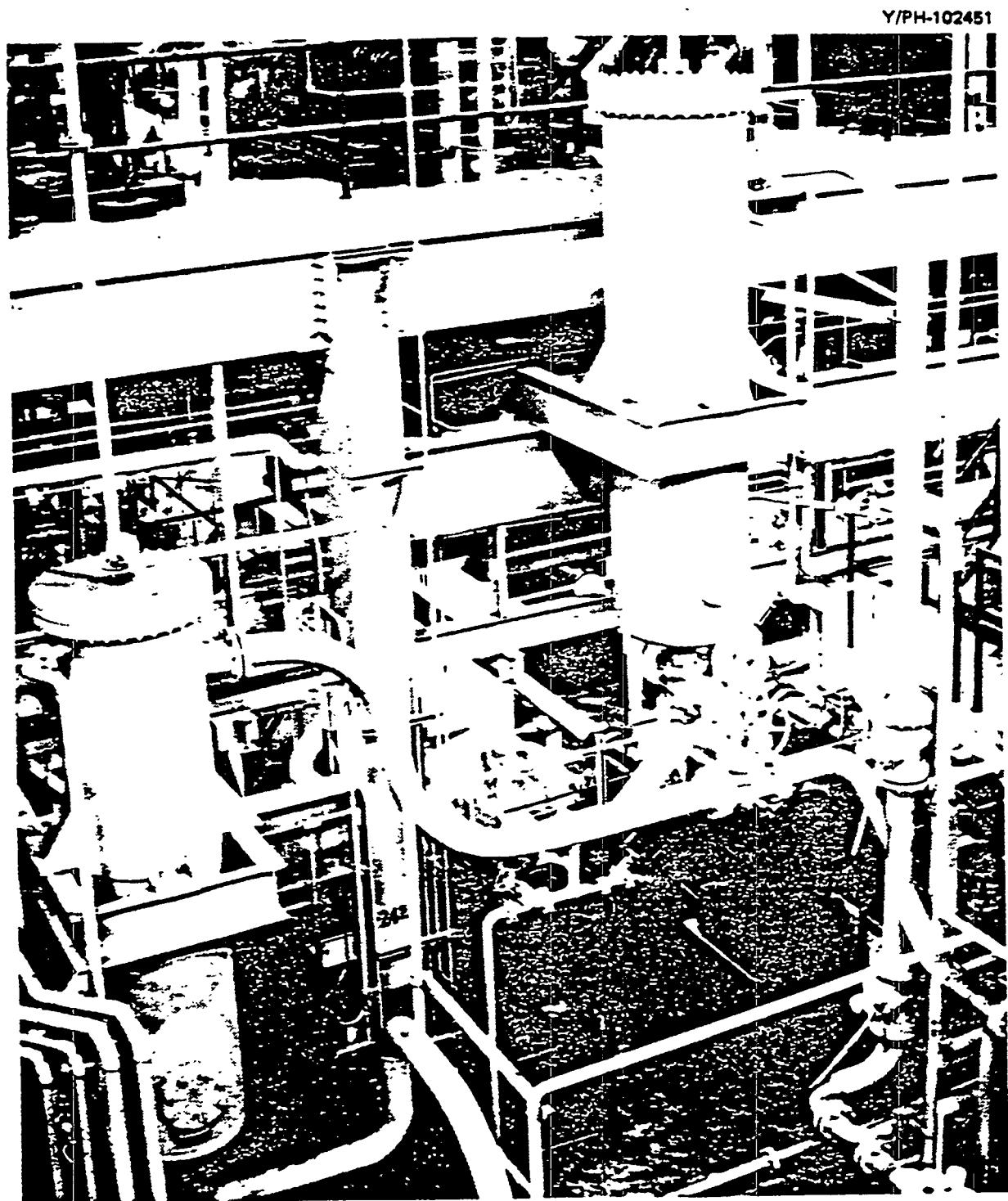


Fig. 1.9. Close-up view of the mercury/nitric acid wash system used to remove impurities from the mercury. (1955 photo)

1.5 SUPPORT FACILITIES

Two major support facilities were constructed at Y-12 to support lithium isotope separation operations. The first of these was the 81-10 Roasting Furnace; the second was the 9720-26 Mercury Warehouse. Each of these facilities is described below.

1.5.1 81-10 Roasting Furnace

The 81-10 Roasting Furnace was constructed by the H. K. Ferguson Company and was installed for the recovery of raw mercury from evaporation filter sludge, cascade decomposer graphite, various filter solids, sump and tank cleanings, and other waste materials from the Colex process. The system consisted of a vertical, natural gas-fired, eight-hearth Nichols-Hershoff furnace; a graphite crusher; cloth shredder; and various auxiliary handling equipment. Of the eight hearths, the two top hearths were heated from below, the four center hearths were heated by gas burners, and the two bottom hearths were spares. An arrangement of rabble arms driven by a drive motor at the bottom of the furnace moved the feed material from hearth to hearth. A forced-air fan provided air to the burners for combustion with the fuel gas. A feed hopper and drive motor continuously delivered feed to the furnace. The feed material was mercury sludge mixed with crushed coke and sand. The coke was used to reduce mercury oxide and also to supply a portion of the heat to the roaster. The sand was used to prevent wet sludge from sticking to the hoist bucket and feed hopper. Water was used to cool the mercury as it fell from the condenser, and it was also used as a scrubbing agent in the scrubber.

A number of problems were immediately apparent upon the initial operation of the 81-10 furnace. The most important of these problems was the inadequacy of the off-gas system, which allowed pressurization of the furnace and resulted in mercury contamination of the area.

1.5.2 9720-26 Mercury Warehouse

The 9720-26 warehouse was constructed in the early 1960s specifically for the purpose of housing surplus mercury (see Fig. 1.10). This warehouse has roughly 15,000 ft² of floor area and can hold almost 50,000 flasks of mercury (each flask containing the standard 76 lb). These flasks are stored with 45 flasks to each pallet, and the pallets are stacked three high. The floor of the 9720-26 warehouse is sloped in such a way that any mercury leaks will be diverted to a drain and catch basin located in one side of the facility. This warehouse is currently in use today to store mercury at the Y-12 site.

1.6 CHRONOLOGY

Figure 1.11 provides a summary of highlights in the chronology of lithium isotope separation operations and subsequent activities.

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1.5.2 9720-26 Mercury Warehouse

The 9720-26 warehouse was constructed in the early 1960s specifically for the purpose of housing surplus mercury (see Fig. 1.10). This warehouse has [REDACTED]

[REDACTED] flasks of mercury (each flask containing the standard 76 lb). These flasks are stored with 45 flasks to each pallet, and the pallets are stacked three high. The floor of the 9720-26 warehouse is sloped in such a way that any mercury leaks will be diverted to a drain and catch basin located in one side of the facility. This warehouse is currently in use today to store mercury at the Y-12 site.

1.6 CHRONOLOGY

Figure 1.11 provides a summary of highlights in the chronology of lithium isotope separation operations and subsequent activities.

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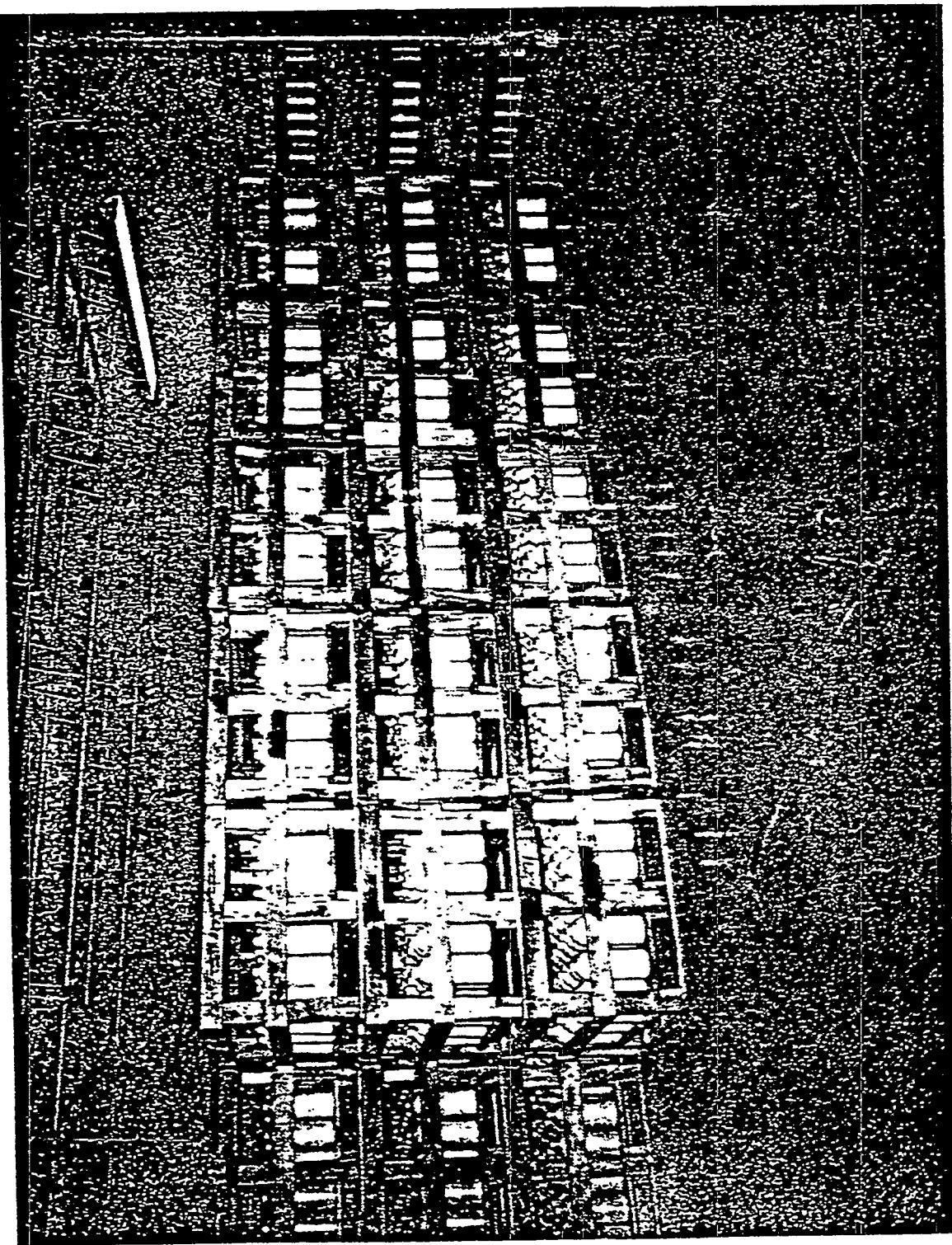


Fig. 1.10. The mercury warehouse in Building 9720-28 (1983 photo).

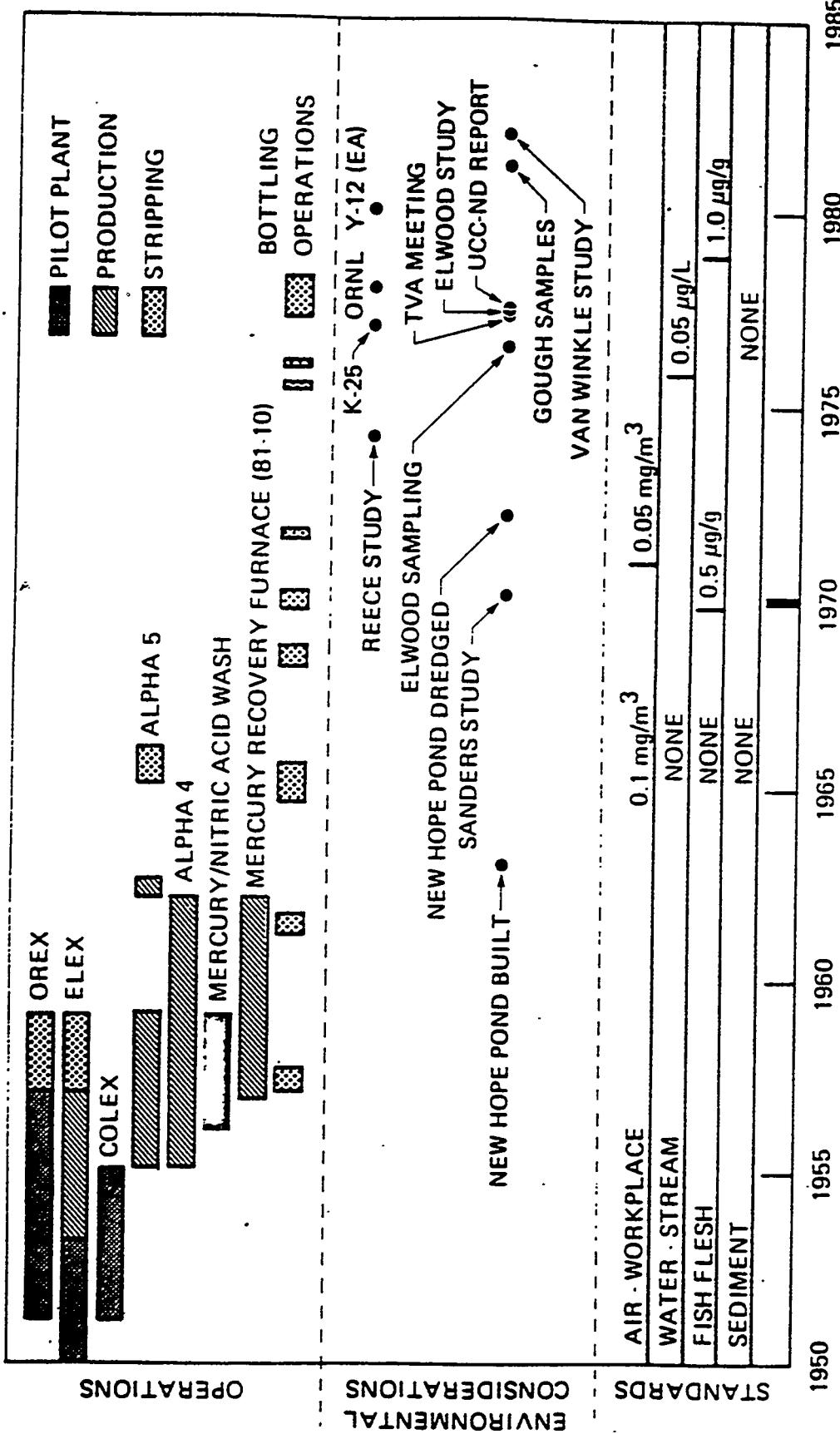


Fig. 1.11. Chronology of lithium isotope separation operations at the Y-12 Plant and related information.

2. THE RECEIPT OF MERCURY BY Y-12

2. THE RECEIPT OF MERCURY BY Y-12

2.1 PROCUREMENT OF MERCURY FOR THE PROJECT

Mercury for initial development studies in the early 1950s on lithium isotope separation was procured by the Y-12 Plant. These quantities were small and are estimated at 23,500 lb for Buildings 9733-1, 9733-2, and 9201-2. The pilot plants in Building 9201-2 (Alpha-2) and production plants in Buildings 9204-4 (Beta-4), 9201-4 (Alpha-4), and 9201-5 (Alpha-5) used mercury procured from the General Services Administration (GSA) by the Atomic Energy Commission (AEC) and delivered to the Y-12 Plant.

The world political situation in the early 1950s dictated secrecy for this project and required a coordinated effort involving the AEC; the Executive Office of the President, the Office of Defense Mobilization; and the Department of Interior, Office of Minerals Mobilization. A brief chronology of some of the key events regarding the procurement of the largest quantities of mercury is as follows:

1. February 14, 1955 - Letter from R. C. Armstrong, Director of Production, Oak Ridge Operations (ORO), AEC, to J. P. Murray, Y-12 Plant Superintendent, Union Carbide Nuclear Company, Oak Ridge, Tennessee. Mr. Armstrong stated that arrangements have been made with the Division of Production for delivery to Y-12 of [REDACTED] mercury for the Alpha-5 and Alpha-4 plants.
2. August 25, 1955 - Letter from E. H. Bloch, Director, Division of Production, AEC, Washington, D.C., to W. S. Floyd, Assistant Director for Materials, Office of Defense Mobilization, Executive Office of the President, Washington, D.C. Mr. Bloch identified mercury requirements.
3. November 15, 1955 - Letter from S. S. Sheppard, Deputy Assistant Director, Office of Defense Mobilization, Executive Office of the President, Washington, D.C., to Mr. Bloch. Mr. Sheppard stated, "The Office of Materials Mobilization (OMM), Department of Interior, was requested to investigate the possibility of expediting the supply of mercury." The OMM responded on October 4, 1955, and stated: [REDACTED]
[REDACTED]
4. December 15, 1955 - Letter from S. R. Sapirie, Manager, ORO, AEC, to C. E. Center, Vice President, Union Carbide Nuclear Company,

Mr. Sheppard further stated that procurement by CSA was dependent upon the AEC entering a contract with the GSA to obtain mercury either directly or through use of the Defense Production Act Authority.

Oak Ridge, Tennessee. Mr. Sapirie stated that enough mercury could be made available for full production of lithium isotope separation facilities.

The GSA procured additional mercury and also shipped some mercury from the U.S. reservoir strategic reserve. Mercury was shipped from several depots (much of it came from the GSA depot in [REDACTED] throughout the United States to a common collection point. The mercury was then secretly delivered to Oak Ridge by cleared drivers.

2.2 DESCRIPTION OF RECEIVING OPERATIONS

Mercury for filling the Elex process in Building 9204-4 (1.5 million lb) was provided by the AEC from GSA mercury. The unloading and emptying of flasks for the Elex process was performed (unlike Colex) by Union Carbide personnel in the production process area. The total mercury going into the process building was weighed; however, the contents of individual flasks were not weighed. The mercury was handled as a chemical commodity, and it was felt from an accountability standpoint it was only important to know what went into the system. An element of uncertainty in the amount received was thus introduced since the invoices assumed that all flasks were filled to the specified weight of 76 lb.

A special mercury unloading facility was constructed and utilized by The Rust Engineering Company (Rust) to receive and transfer the mercury [REDACTED] to Colex process buildings, 9201-4 and 9201-5 (see Fig. 2.1). At this time, Rust was responsible for receiving and emptying the mercury flasks at the Y-12 Plant. The building was an open structure and used large fans to ensure adequate air flow for their employees.

Trucks were backed into three unloading docks, and the flasks were gravity-fed to unloading positions. Workers used impact wrenches to remove caps on the flasks. The flasks were then placed in an emptying trough at about a 70° angle to empty most of the mercury (see Fig. 2.2). The emptied mercury was collected in a three-section storage tank. Flasks were placed on a conveyor belt to be transported to vehicles for loading on trucks. The flasks were not absolutely empty, and some mercury was reported lost during the transfer and loading on the trucks, as well as in transit to the salvage yard. The salvage yard was located just west of Building 9204-4.

At the storage yard, Rust employees attempted to drain any remaining mercury from the flasks. Mercury obtained from this operation was collected in buckets and transferred back to the receiving station and poured into the trough with other mercury being received. The empty flasks were held in the storage yard for salvage or eventual reuse.

Invoices for the mercury were handled between Rust and the AEC. The Y-12 Plant assumed accountability for the mercury when the mercury was fed to the cascade through pipes from the storage tank. Neither Rust nor AEC weighed individual bottles or accurately accounted for

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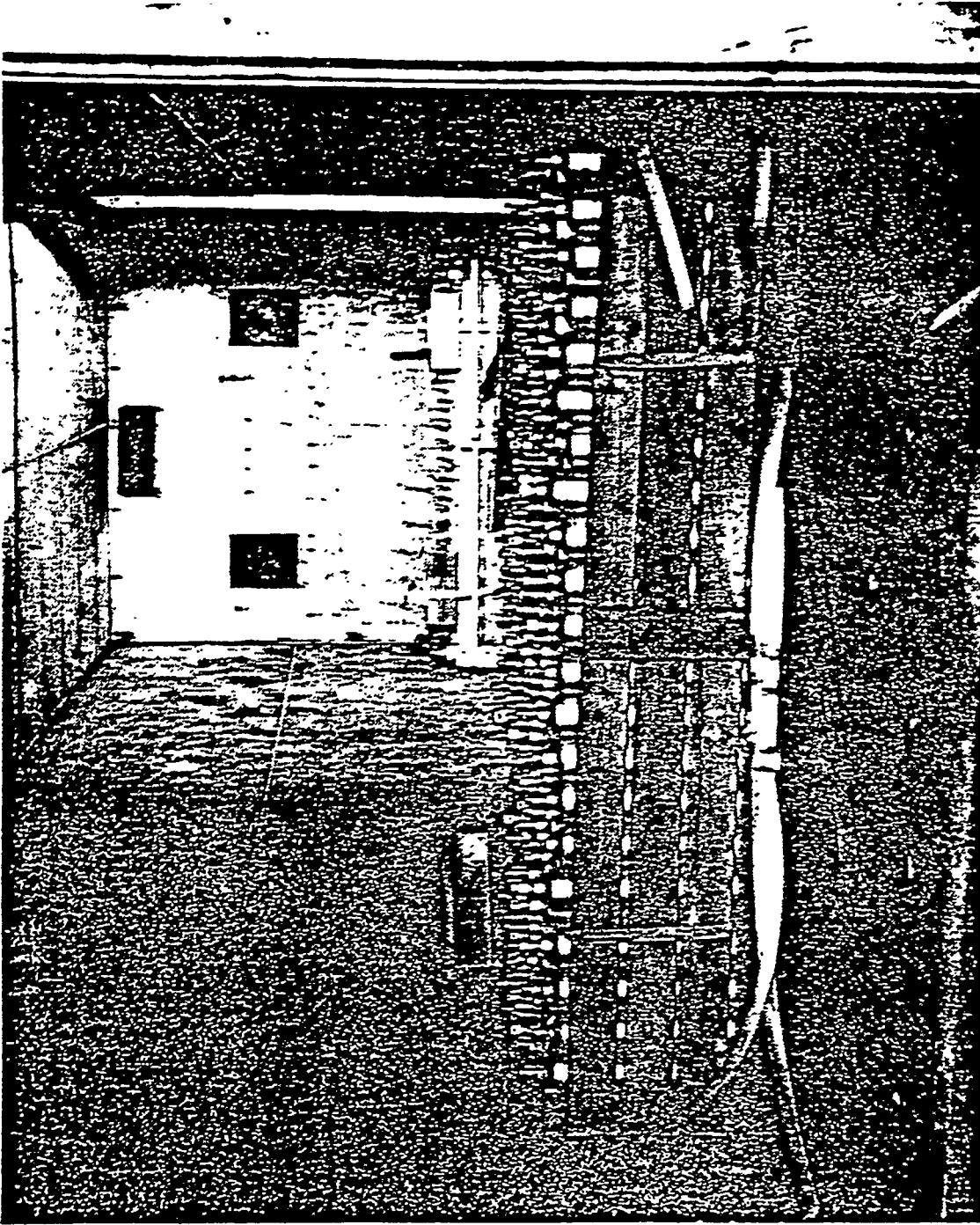


Fig. 2.1. Mercury flasks arriving at the Rust Engineering unloading facility.
(1955 photo, courtesy DOE)

ORO/PH-55-782-4

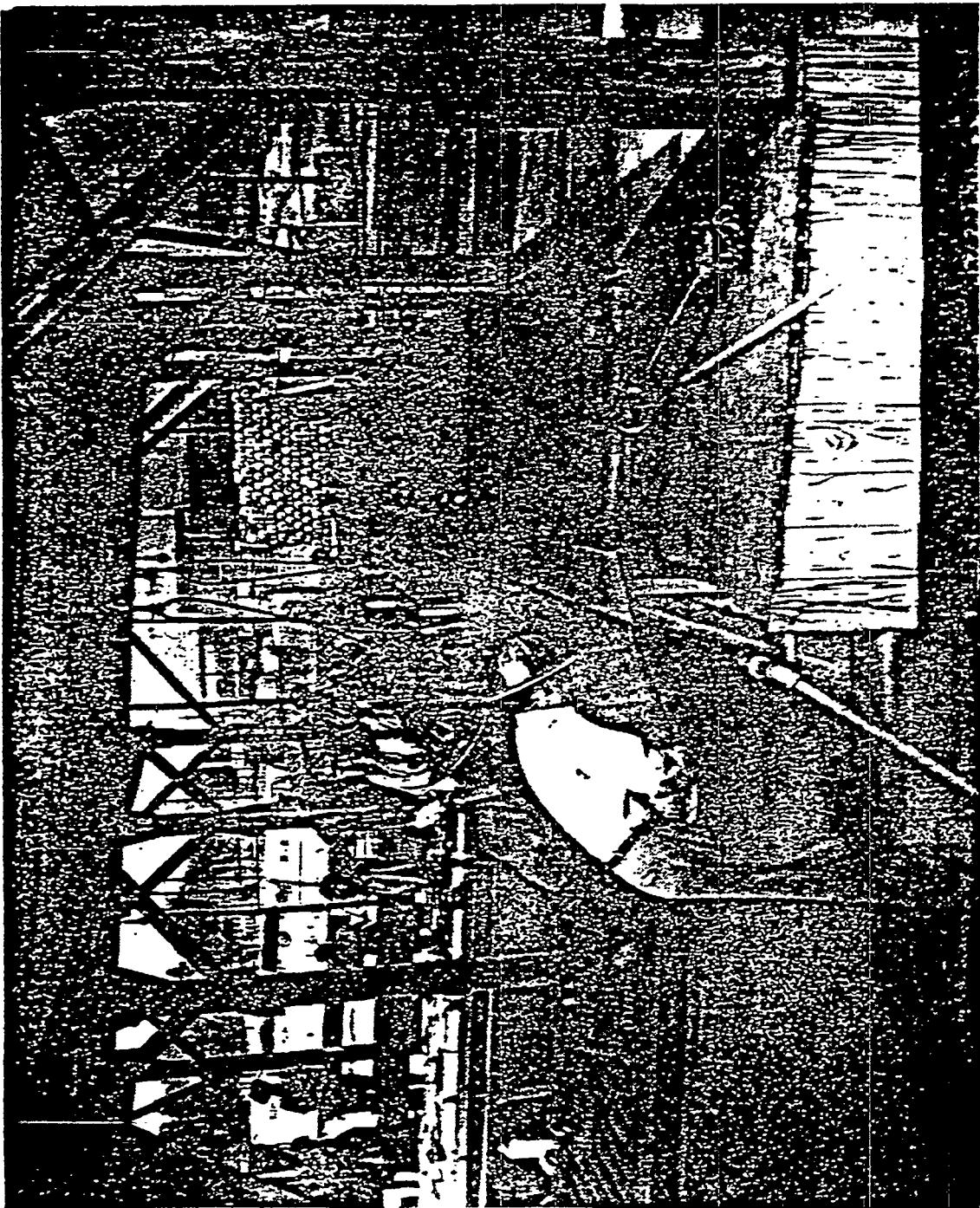


Fig. 2.2. Mercury flasks being unloaded by Rust Engineering personnel.
(1955 photo, courtesy DOE)

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mercury delivered versus mercury ordered and accepted. The GSA invoiced a total weight of 76 lb of mercury per flask. There is an uncertainty in the amount of mercury actually received since mercury had leaked from some flasks. Further discussion on this topic is found in Section 2.4.2.

2.3 THE TRANSFER VOUCHER RECORDS

Transfer vouchers were prepared by the AEC based on GSA invoices. These were then sent to Union Carbide. The vouchers transferred accountability for the mercury to the capital and operating budget activities for the lithium separation project. The first AEC transfer is further evidenced by an AEC letter that states actual delivery of this quantity of mercury was between December 1952 and February 1953 (Ref. 1).*

Summary of AEC Transfer Vouchers

<u>Date</u>	<u>Voucher number^a</u>	<u>Quantity (lb)</u>
May 19, 1954	54-5-305	1,457,067
May 23, 1955	55-5-564	10,000,000
June 27, 1955	55-6-621	2,400,000
August 19, 1955	56-8-285	4,986,632
October 13, 1955	56-10-133	3,412,781
January 31, 1956	56-1-720	375,212
June 20, 1956	56-6-395	<u>1,693,660</u>
TOTAL		24,325,352

^aSee Reference 2.

2.4 UNCERTAINTIES IN FLASK QUANTITIES

2.4.1 Contributors to Uncertainties

One of the major contributors to uncertainties associated with the quantity of mercury received at Y-12 was the environment in which the lithium isotope separation process was developed, constructed, and operated. Due to the 1953 detonation of a Russian hydrogen bomb, an atmosphere prevailed that was similar to the Manhattan Project. The lithium project was approached with the same enthusiasm and by many of the same people. The AEC authorized special procedures to get the job done, and people worked around the clock seven days a week.

*References are listed at the end of each section.

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Summary of AEC Transfer Vouchers

<u>Date</u>	<u>Voucher number^a</u>	<u>Quantity (lb)</u>
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
TOTAL		

^a See Reference 2.

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*References are listed at the end of each section.

Mercury was considered as a chemical commodity to be used in the plants. The job environment was to get mercury, get the plants going, and let the paperwork catch up. The paperwork catch-up was slow and further complicated by the split of responsibilities in the mercury acquisition. The AEC procured the mercury through the GSA, and Rust received and emptied the flasks for the Colex process plants. The Y-12 Plant accepted mercury without paperwork or audits. The AEC issued transfer vouchers to Y-12 later to reflect the quantity of mercury which bills of loading from Rust reflected.*

The emphasis on transfer vouchers was based on cost, and the data indicate that average cost per pound of mercury was used to calculate the mercury accountability. Transfer Voucher [REDACTED] (Ref. 2) is an example. This voucher reflected mercury cost, and a handwritten note indicates that this was for [REDACTED] mercury, which was then charged to the Y-12 Plant inventory.

The primary source of information for the total amount of mercury Y-12 received [REDACTED]
[REDACTED]

The only information contained on each voucher is a total amount of mercury and the price per pound. There was, therefore, no way of looking at a voucher and determining how many shipments each voucher represented.

A second significant contributor to the uncertainty was the availability of documentation and records. The AEC and Rust records have been destroyed and the Union Carbide Corporation, Nuclear Division (UCC-ND) records, by existing regulation, should also have been destroyed. Location and retrieval of old files have not provided all of the information desirable. An example is the beginning stores inventory of 300,000 lb noted in an operations employee's worksheet (Ref. 2) covering some early stores issues and subsequent indication of an additional 179,000 lb. This 479,000 lb was ultimately resolved. It is strongly felt that this is part of the original issue of mercury to Y-12 from the GSA since the first deliveries to UCC-ND were in December 1952. Early deliveries were summarized and included [REDACTED]
[REDACTED]

2.4.2 Uncertainties in Quantity Per Flask

The world standard for procurement of mercury is a flask containing 34 1/2 kg net weight. This translates into a minimum quantity per flask of 76 lb. The flasks are made of low-carbon steel and have no standard shape. Flasks are therefore manufactured in a

[REDACTED]
[REDACTED]
[REDACTED]

variety of shapes, depending on the individual desire of the mercury producer and regional preference of the part of the world where the mercury was mined. The requirement for such a large volume of mercury in a short time exceeded the U.S. production capacity, and the mercury was procured from several sources throughout the world.

The quality of steel is not specified, and flasks are known to rust and leak. A representative sample of the various flask shapes in the GSA-supplied mercury are shown in Figure 2.3. Some of the flasks are very old and probably were previously used.

Rust personnel who performed the mercury dumping operation were not available to interview on the condition of incoming flasks. However, general comments were made on June 7, 1983, by Leroy Jackson, now retired but then Director, Special Projects Division, AEC-ORO; and on June 9, 1983, J. W. Strohecker (UCC-ND) did recall that some bottles had leaked. The leaking condition of the bottles was further substantiated by Dan Polley, now retired but then Chief of the Property Management Branch of the Supply Division, AEC-ORO, in an interview on June 3, 1983 (Ref. 3). Mr. Polley was not present during the unloading but did offer the following comments on his inspection of GSA-supplied mercury flasks that had not been emptied.

Question: Could you make some statement as to the condition of the mercury as it was being received from outside sources?

Response: Well, I was not there at the time the mercury was received. I've checked with a few people that I know, and I can't find anybody that remembers them doing a very good job of receiving. They said that stuff was coming in so fast they'd just take a truckload, making an RI, and that's it. Now, I did go to the Y-12 warehouses where they had some mercury stored that had been delivered but never placed in the system. I checked some of the skids and found there were many leakers.

A lot of them were just little piddling leaks. Some of the flasks were, oh, probably half full; some of them, just a little bit leaked out. And we found two or three flasks on several of them that were completely empty and drained out, and I doubt if there was any material as received. I've never been able to find out how they received that other than by the truckload. I don't think they scaled those flasks in or anything.

Question: Would you have any feel for some way that we could go back to GSA to possibly find in their records what the average was across their other customers that had gotten things from them, that they might have actually weighed them?

Response: I know of no way. I think what they did when they shipped--they just used the weights that they used when they took them into storage there. I did find some flasks there

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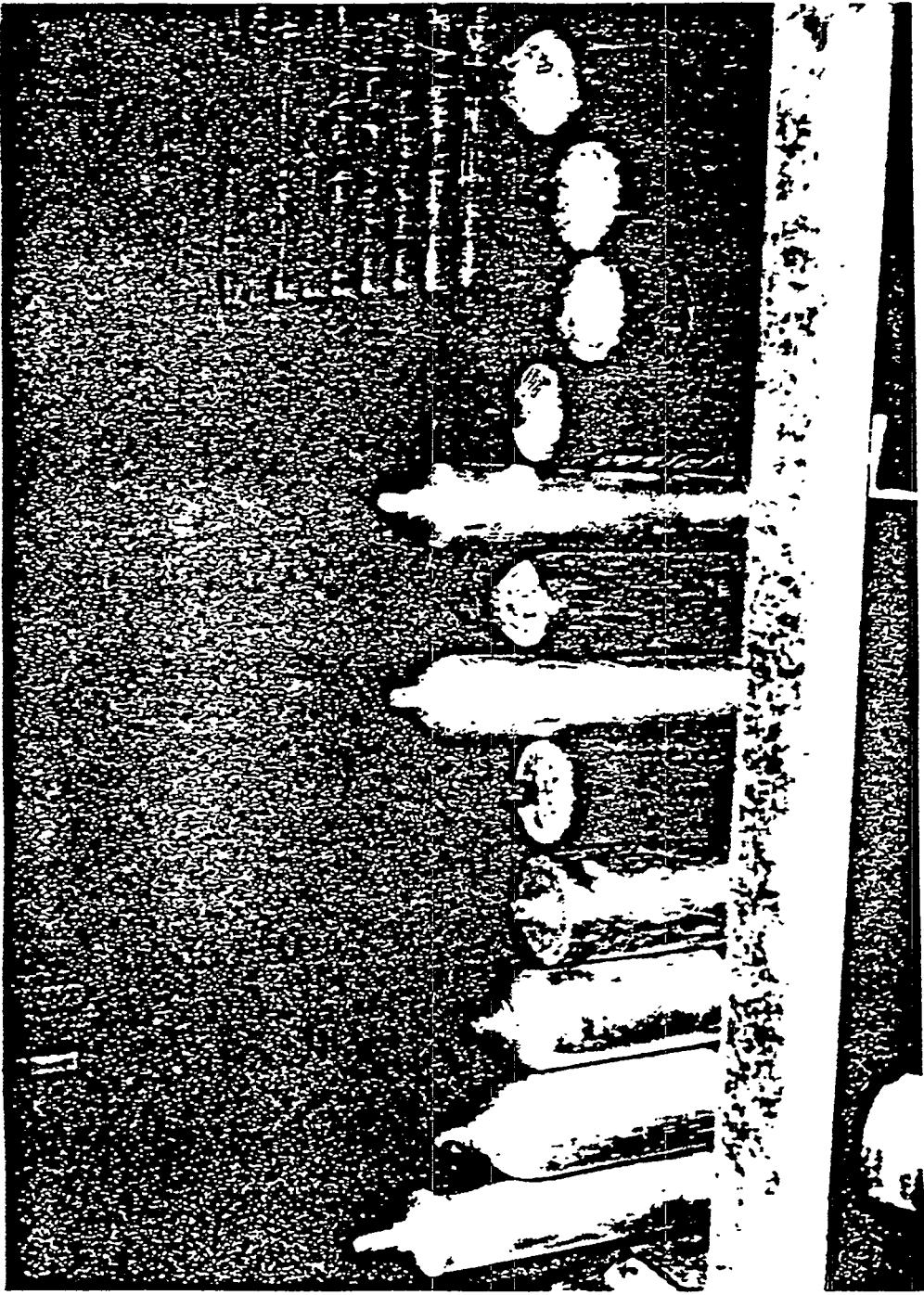


Fig. 2.3. Sample of original GSA mercury flasks.
(1855 photo, courtesy DOE)

...t were over 200 years old. Those old Spanish flasks look like wine jugs. They were rusted through and leaking from hole leaks. In fact, most of it was re-flasked. We put it in stainless steel flasks when we shipped it back to the stockpile. Now, that number that they're using, I think is the difference that GSA made a commission settlement for; they claimed they'd shipped all of this in there, and we'd only shipped so much back. It's my feeling that a lot of it was never received. As I said before, about 4, maybe 5% [were] short ships.

Mr. Polley also recalled a visit by GSA inspectors to investigate the leaking condition of the flasks. The following excerpts are from a United States Government Memorandum that was obtained from GSA files which discusses a trip to Oak Ridge (Ref. 4).

It has been reported than an unknown number of flasks are leakers and the mercury in them should be put into sound flasks. Mr. Polley of AEC advised that the Commission would inspect each flask for leakers and re-flask where necessary. There is equipment at Oak Ridge for this purpose. He suggested that the flasks be shipped loose from Oak Ridge to the various depots where the mercury is to be stored in order to save transportation costs on the pallets. This suggestion was based on the results of shipping about 13,000 flasks to Anniston, Alabama, some time ago.

There is no way to accurately quantify mercury losses in leaking, partially filled, empty flasks or weight/flask shortages by suppliers. If this were possible, it would contribute significantly to understanding the accuracy of the quantity of mercury invoiced to the Y-12 Plant. For example, if the material was 2% short-shipped and if the Y-12 Plant was invoiced with 24,325,352 lb of mercury, this would represent a short shipment of 486,507 lb.

Another uncertainty is added since mercury flasks are not normally completely emptied. The Environmental Protection Agency (EPA) (Ref. 5), in a 1975 report, estimated that 0.0454 kg of mercury will remain in empty flasks. Investigations of a few empty flasks remaining from the original fill of mercury at Y-12 indicate that mercury has remained in the flasks. The interior of the flasks was porous, had uneven and irregular surfaces, and had weld areas to which mercury could adhere. A total of 32.48 g of mercury was poured out of the first bottle examined (Figs. 2.4 and 2.5). An additional 24 bottles were emptied and weighed. The quantities varied from less than 1 g to a high of 163 g.

that were over 200 years old. Those old Spanish flasks look like wine jugs. They were rusted through and leaking pinhole leaks. In fact, most of it was re-flasked. We put it in stainless steel flasks when we shipped it back to the stockpile. Now, that number that they're using, I think is the difference that GSA made a commission settlement for; they claimed they'd shipped all of this in there, and we'd only shipped so much back. It's my feeling that a lot of it was never received. As I said before, [were] short ships.

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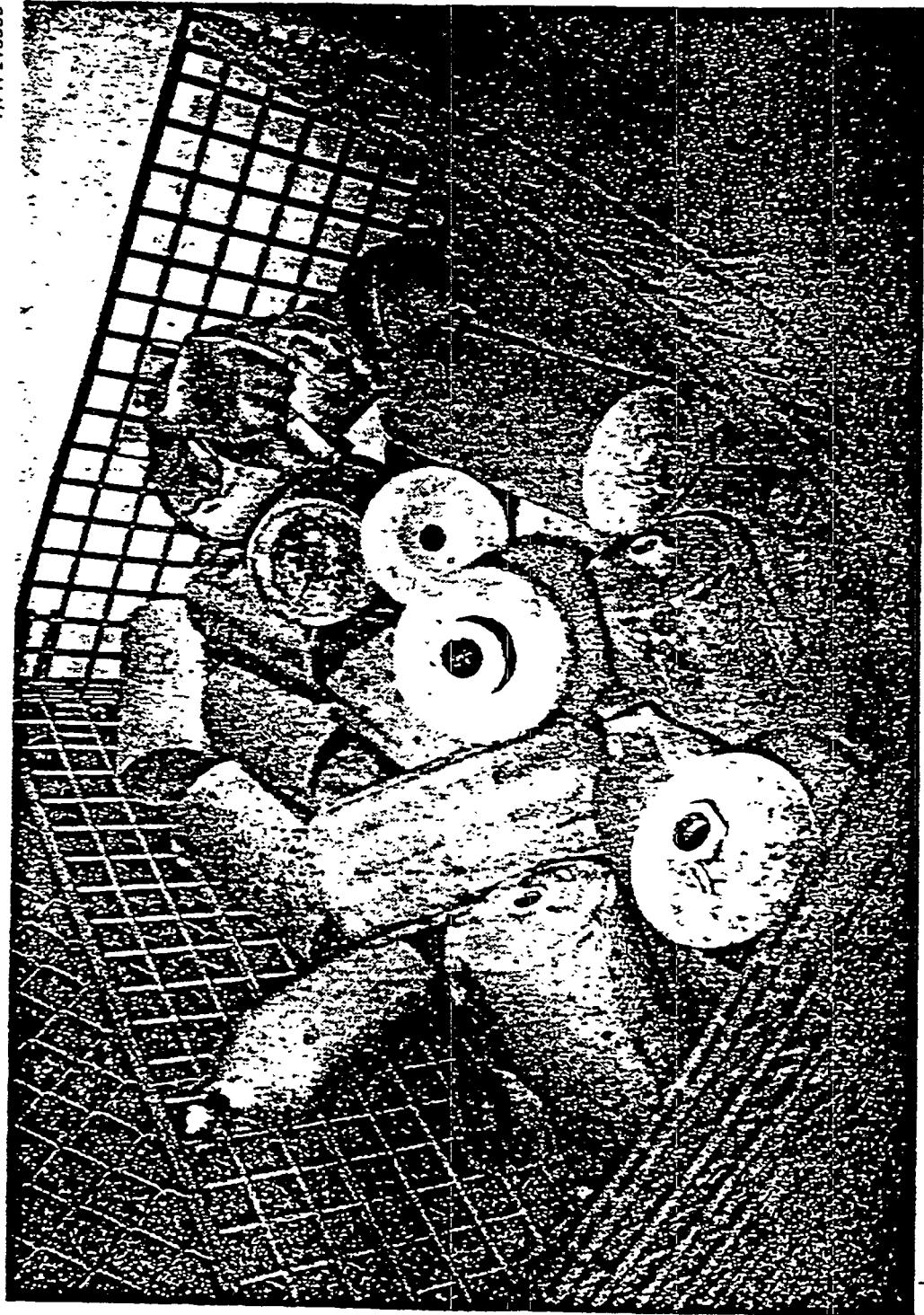


Fig. 2.4. GSA flasks remaining from the original fill of mercury at Y-12
(1983 photo)

V/PH-213998



Fig. 2.5. Recovery of 32.48 g of mercury from one of the original "empty" flasks.

<u>Bottle number</u>	<u>Weight (g)</u>	<u>Bottle number</u>	<u>Weight (g)</u>
1	<1	14	.5
2	<1	15	<1
3	<1	16	<1
4	2	17	<1
5	9	18	1
6	<1	19	16
7	<1	20	73
8	3.	21	<1
9	17	22	4
10	<1	23	163
11	1	24	14
12	<1	25	32
13	6		

$$\bar{n} = 25.0$$

$$\bar{x} = 14.3 \text{ g}$$

$$\sigma = 34.6 \text{ g}$$

[REDACTED] flasks were emptied at the Y-12 Plant. Assuming the EPA average (Ref. 5) of 45.4 g, this represents [REDACTED] of mercury for which Y-12 is accountable that remained in the flasks. Some of the flasks were ultimately cleaned and reused; however, about [REDACTED] flasks were sold as salvage.

Discussions were also held with mercury suppliers and users of mercury. Their experience is that flasks of mercury do not contain exactly 76 lb. One supplier stated that they depend on averages to compensate for filling variation. In addition to weighing errors, one flask was identified that would hold only 74 lb (Ref. 6) during Y-12 bottling operations.

Other uncertainties were introduced later when the mercury was rebottled and returned to the GSA inventory. In January and February 1957, [REDACTED] flasks of mercury were shipped back to the GSA in two lots. A letter from the GSA, "Defense Materials Service to AEC," described Lot Number 1 as being ~9,000 flasks that had never been opened (Ref. 2). The AEC was instructed to ship only full units, sorting out any obvious leakers and unfilled units. The bottling procedure used by Y-12 (Ref. 2) required reused flasks to be held in the bottling area for 24 h in an effort to discover leakers before they were moved to storage areas.

A GSA inspector reported in 1963 that mercury flasks were leaking. Excerpts from this letter follow: (Ref. 4)

On the morning of September 18, 1963, . . . enough could be seen to form an adequate picture of the [REDACTED] flasks in this area.

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Bottle number	Weight (g)	Bottle number	Weight (g)
1	<1	14	5
2	<1	15	<1
3	<1	16	<1
4	2	17	<1
5	9	18	1
6	<1	19	16
7	<1	20	73
8	3	21	<1
9	17	22	4
10	<1	23	163
11	1	24	14
12	<1	25	32
13	6		

$$\bar{n} = 25.0$$

$$\bar{x} = 14.3 \text{ g}$$

$$\bar{z} = 34.6 \text{ g}$$

Over 300,000 flasks were emptied at the Y-12 Plant. Assuming the EPA average (Ref. 5) of 45.4 g, this represents 33,750 lb of mercury for which Y-12 is accountable that remained in the flasks. Some of the flasks were ultimately cleaned and reused; however, about 200,000 flasks were sold as salvage.

Discussions were also held with mercury suppliers and users of mercury. Their experience is that flasks of mercury do not contain exactly 76 lb. One supplier stated that they depend on averages to compensate for filling variation. In addition to weighing errors, one flask was identified that would hold only 7 $\frac{1}{4}$ lb (Ref. 6) during Y-12 bottling operations.

Other uncertainties were introduced later when the mercury was rebottled and returned to the GSA inventory. In January and February 1957, 13,750 flasks of mercury were shipped back to the GSA in two lots. A letter from the GSA, "Defense Materials Service to AEC," described Lot Number 1 as being ~9,000 flasks that had never been opened (Ref. 2). The AEC was instructed to ship only full units, sorting out any obvious leakers and unfilled units. The bottling procedure used by Y-12 (Ref. 2) required reused flasks to be held in the bottling area for 24 h in an effort to discover leakers before they were moved to storage areas.

A GSA inspector reported in 1963 that mercury flasks were leaking. Excerpts from this letter follow: (Ref. 4)

On the morning of September 18, 1963, . . . enough could be seen to form an adequate picture of the 34,000 flasks in this area.

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Identification of leaking flasks was impossible because of the slope. Mercury was visible in all the cracks in the pad, and stood in pools along the low side of the pad, indicating a considerable loss of mercury.

Nearly all the flasks show evidence of rust, with some being so badly rusted that curved sections one-eighth inch thick fall away at the pull of a finger It is estimated that about 25% of the flasks should be replaced

Evidence of leakage was found on six pallets.

In 1974, the GSA also directed that the remaining mercury inventory be rebottled in new flasks. This action was taken for two reasons. A large number of flasks sold to the private sector from their stockpile at Y-12 had developed leaks, and customers wanted their flasks replaced with full flasks. Also, the GSA mercury was to be placed in long-term storage and new flasks were desirable to prevent further leaks.

The mercury flasks continued to develop leaks, and in 1974, Union Carbide refused to ship any more mercury until the mercury could be repackaged in a safe shipping container. The GSA reported this condition in a trip report following a visit to Oak Ridge in October 1974 (Ref. 4).

As a result of complaints from buyers regarding leaking flasks of mercury in recent shipments, and the serious leaking condition of flasks still in storage at the AEC plant, Oak Ridge, Tennessee, the handling contractor, Union Carbide, has refused to ship any more mercury out of the AEC plant until the mercury has been refluksed or repackaged in a safe shipping package Although the packaging appeared adequate for this shipment, the AEC management was adamantly opposed to shipping any more of the 2276 flasks of mercury until it had been refluksed into new flasks.

2.5 BEST ESTIMATES OF QUANTITY RECEIVED AND CONFIDENCE STATEMENTS

The best estimate of the total amount of mercury received by Y-12 is [REDACTED] by voucher from the AEC based on full flasks (76 lb per flask) and 23,500 lb procured by Y-12 for early development experiments and pilot plants for a total of [REDACTED].

All information about uncertainty of the amount of mercury received is based on antedated evidence rather than on measurement data. There is no way to calculate objective and technically meaningful limits of error for this estimate. Factors that affect the credibility of the estimate are discussed in detail throughout Section 2.

REFERENCES

1. R. C. Armstrong, "Solvent Receipts and Costs (U)," letter to S. R. Sapirie, May 25, 1954. SECRET-RD.
2. "Mercury Task Force Audit Work Paper," File M-780, Union Carbide Corporation, Nuclear Division, Oak Ridge Y-12 Plant, June 1983. SECRET-RD.
3. C. D. Doty, interview with Dan Polley, File M-786, Mercury Task Force, June 3, 1983.
4. Review of GSA Files in Washington, D. C., File M-841, Mercury Task Force, June 1983.
5. Materials Balance and Technology Assessment of Mercury and Its Compounds on National and Regional Bases, EPA Study 560/3-75-007, October 1975.
6. Bottling Log Book, File M-336, Mercury Task Force, Union Carbide Corporation, Nuclear Division, Oak Ridge Y-12 Plant, p. 103.

3. QUANTITIES OF MERCURY ACCOUNTED FOR BY Y-12

3. QUANTITIES OF MERCURY ACCOUNTED FOR BY Y-12

3.1 QUANTITIES BOTTLED FOR RETURN TO STOCKPILES

3.1.1 Description of Bottling Operations

When the Building 9204-4 facility was shut down in 1956, a need existed for an operating inventory in the Colex facilities (Buildings 9201-4 and 9201-5); therefore, the mercury was not bottled for storage but was transferred directly to the Colex buildings by means of a pipeline. Transfer was affected by gravity flow from a calibrated tank, which was at a higher elevation than the receiving tanks in the Colex building. Accountability was maintained by batch transfer from the calibrated tank.

The first bottling campaign came in the late 1950s as a result of a General Services Administration (GSA) request to return mercury to the Federal stockpile (Ref. 1). At that time, [REDACTED] mercury were stored at Y-12 in the original flasks. To fill the GSA request, it was necessary to remove an additional [REDACTED] of mercury from the operating system for bottling. A bottle-loading system was designed and constructed for this operation. The bottling station, as designed, was simple when compared to a commercial liquid-filling system but was effective.

Empty flasks were manually placed on a roller conveyor and rolled into the loading station in the vertical position. A nozzle was inserted into the flask opening, the filling valve was manually opened, and a preset amount of mercury was poured into the flask. When mercury ceased to flow into the transparent nozzle, the fill valve was closed and the flask was moved to the capping section of the fill station (see Fig. 3.1) where a threaded plug was inserted and tightened into the bottle opening by means of an air wrench. The flasks were then moved to the end of the roller conveyor where they were set and banded to flat pallets that held 25 flasks.

In later bottling campaigns, the pallets were changed to a GSA specification, which was a box-like pallet holding 43, 44, or 45 flasks.

The predetermined amount of 76 lb + 2 oz - 0 oz (Ref. 2) was accomplished in the following manner: A small closed tank, which held ~80 lb of mercury, was mounted on a scale with an overflow at about the 77-lb level. A threaded shaft that could be adjusted to any depth in the tank was located in the top of the closed tank. By raising or lowering this shaft into the flask, it would either add or subtract to the volume available in the tank at the overflow level.

To fill the measuring tank, a button was pushed that operated an electric solenoid valve in a line from the mercury head tank to the measuring tank. A timer on the electric valve was set so that slightly more than the measuring tank capacity was permitted to flow from the head tank to the measuring tank. The excess overflowed from the measuring tank to a surge tank where it was later returned to the head tank.

V/PW 21400J



Fig. 3.1. Mercury flask bottling station. 1983 photo of
station last used in 1977.

The operator who was filling flasks would not open the fill valve until overflow was stopped and the dial indicator on the scale indicated 76 lb.

The entire measuring system sat on a scale with all liquid connections made in flexible hoses so that there was no bias to the indicated weight. The scales were checked for calibration on a daily basis and sample bottles were periodically removed to have the net weight checked.

The Building 9201-5 production facility was shut down in March 1959 (Ref. 3) and left in a standby condition. In December 1962, [REDACTED] back into operation for six months to produce 5,000 kg of "marble" (the code name for the isotope of lithium with an atomic weight of 7). The Building 9201-4 plant was shut down and put on standby in December 1962. The mercury inventory in these buildings was left in the process equipment when the facilities were placed on standby.

Later directives for the bottling of mercury were transmitted by the Atomic Energy Commission (AEC) to Y-12 management. These requests were to bottle mercury for return to the government stockpile or to have available a sufficient number of flasks on hand at Y-12 to fulfill the GSA disbursement of mercury for commercial sale or distribution to other government agencies.

A major campaign to bottle the mercury remaining in Building 9201-4 was undertaken in 1977. Substantial equipment reactivation and modifications were made before the actual bottling began. A second bottling station was installed, and the existing station was upgraded and equipped to automatically fill each flask to the required quantity. A new ventilation system was installed to exhaust each hood. The building vacuum system was restored to full capacity by the replacement of the second vacuum pump. Safety showers, eye wash stations, fresh air stations, building exhaust fans, and rest room facilities were activated at critical locations throughout the building. A mercury transfer line from the east side of the building to the west side was installed, and critical mercury transfer pumps were removed, rebuilt, and reinstalled. Storage tanks were cleaned, inspected, and prepared for use. A water-treatment facility was installed to treat mercury-contaminated water prior to disposal. Interim mercury storage areas were provided in Building 9201-4, and a permanent storage area was prepared in Building 9720-26.

In addition to equipment modifications (Ref. 5) and reactivation, much planning and organization were performed. Specifications for new flasks were prepared, and a purchase order was awarded to Norris Industries in Los Angeles, California. A mercury bottling procedure was prepared, as were column washing, water treatment, and mercury cleaning procedures. Health and safety training instruction for mercury operations was prepared, and each employee was trained. Detailed safety analysis reports were prepared for the flasking and washing operations and were approved by a committee from the Safety and Environmental Control Division of the Department of Energy, Oak Ridge Operations (DOE-ORO). The committee also made a preoperational tour of the facility.

After the columns in Building 9201-4 were emptied, they were filled with water and vibrated to dislodge any residual mercury adhering [REDACTED] inside the column. The bulk mercury was bottled, and the mercury-contaminated water was chemically treated, filtered, and sampled prior to disposal.

The job was completed with no serious mercury air-count problems or incidents.

3.1.2 Chronology and Inventory of Bottling Operations

A total of [REDACTED] flasks that were never emptied) were returned to the GSA stockpile or transferred to the Y-12 Materials Department for storage during the period from January 1957 through December 1977 (Ref. 6).

SUMMARY OF QUANTITIES

	<u>Date</u>	<u>Activity</u>	<u>Pounds</u>
GSA	1 Jan.-Feb. 1957	Mercury returned to GSA	[REDACTED]
L-5	2 Dec. 1960-June 1961	Mercury bottled and stored	[REDACTED]
	3 July 1964-May 1965	Mercury bottled and stored	[REDACTED]
	4 Mar. 1968-May 1968	Mercury bottled and stored	[REDACTED]
	5 Oct. 1969-Nov. 1969	Mercury bottled and stored	[REDACTED]
	6 June 1971	Mercury bottled and stored	[REDACTED]
	7 March 1975	Mercury bottled and stored	[REDACTED]
	8 Nov. 1975	Mercury bottled and stored	[REDACTED]
9201-4 columns	9 Jan.-Dec. 1977	Mercury bottled and stored	[REDACTED]
	TOTAL		[REDACTED]

price in [REDACTED]

3.1.3 Uncertainties and Confidence Statements

Most of the mercury bottled was material recovered from the lithium enrichment operations. However, during the campaigns that took place during July 1964 through May 1965 and during December 1977, a substantial number of leaking or otherwise damaged flasks were rebottled. The rebottling effort was duly noted in the daily log at the bottling plant, as required by the written operating procedure for the bottling plant issued in 1965. The procedures called for a rebottled flask to be given a serial number [REDACTED] which would distinguish it from the flasks that were not rebottled.

Leaking or damaged flasks were a source of concern, and a significant amount of attention was focused on the bottling procedures and leaking flasks. All filled bottles were held in the bottling area for 24 h in an effort to detect leakers before they were shipped to the storage area.

Another uncertainty concerns the true amount of mercury actually put into each bottle. In order to avoid short-changing the customer who would eventually buy the mercury, the bottling procedure (Ref. 2)

After the columns in Building 9201-4 were emptied, they were filled with water and vibrated to dislodge any residual mercury adhering to the packing rings inside the column. The bulk mercury was bottled, and the mercury-contaminated water was chemically treated, filtered, and sampled prior to disposal.

The job was completed with no serious mercury air-count problems or incidents.

3.1.2 Chronology and Inventory of Bottling Operations

A total of 285,084 flasks (275,402 filled plus 9,682 flasks that were never emptied) were returned to the GSA stockpile or transferred to the Y-12 Materials Department for storage during the period from January 1957 through December 1977 (Ref. 6).

SUMMARY OF QUANTITIES

<u>Date</u>	<u>Activity</u>	<u>Pounds</u>
Jan.-Feb. 1957	Mercury returned to GSA	
Dec. 1960-June 1961	Mercury bottled and stored	
July 1964-May 1965	Mercury bottled and stored	
Mar. 1968-May 1968	Mercury bottled and stored	
Oct. 1969-Nov. 1969	Mercury bottled and stored	
June 1971	Mercury bottled and stored	
March 1975	Mercury bottled and stored	
Nov. 1975	Mercury bottled and stored	
Jan.-Dec. 1977	Mercury bottled and stored	
TOTAL		21,666,384

3.1.3 Uncertainties and Confidence Statements

Most of the mercury bottled was material recovered from the lithium enrichment operations. However, during the campaigns that took place during July 1964 through May 1965 and during December 1977, a substantial number of leaking or otherwise damaged flasks were rebottled. The rebottling effort was duly noted in the daily log at the bottling plant, as required by the written operating procedure for the bottling plant issued in 1965. The procedures called for a rebottled flask to be given a serial number with a suffix "A," which would distinguish it from the flasks that were not rebottled.

Leaking or damaged flasks were a source of concern, and a significant amount of attention was focused on the bottling procedures and leaking flasks. All filled bottles were held in the bottling area for 24 h in an effort to detect leakers before they were shipped to the storage area.

Another uncertainty concerns the true amount of mercury actually put into each bottle. In order to avoid short-changing the customer who would eventually buy the mercury, the bottling procedure (Ref. 2)

issued in 1965 called for filling each bottle with a measured amount that fell between 76 lb 1 oz \pm 1 oz. It is not known what procedure was used before 1965, but it is reasonable to assume that regardless of what the procedure was, it was not more accurate than the 1965 procedure. Once a bottle was determined to have an acceptable amount of material in it, it was credited to the accounting system as containing exactly 76 lb. The accounting system was also credited with an estimate of the total overage, which is determined by multiplying the number of bottles by 1 oz. Thus an estimate of the total amount of mercury bottled can be determined either by multiplying the total number of flasks by 76 lb 1 oz or by adding together the accounting records for each flask bottled (which, as mentioned earlier, is 76 lb), plus the estimate of the total overage (which is obtained by multiplying the total number of bottles by 1 oz).

In addition to describing how to fill the bottles, the 1965 bottling procedure also required that the scales be accurate to within ± 2 oz for a 75-lb test weight. This variation in the scales, plus the variations in the actual amount of mercury in the bottle, suggest that the standard deviation for the true amount of material in a bottle should be ~ 1 oz. Thus it can be speculated that if the bottling procedure was followed exactly, the distribution of the true amount of mercury in the bottles should have a mean of ~ 76 lb 1 oz and a standard deviation of ~ 1 oz.

This speculation is supported by a check weight study done on bottles filled during the 1977 campaign (Ref. 7). A sample of 454 bottles was randomly selected and their contents remeasured. The average weight was 76 lb 1.04 oz, with a standard deviation of 0.72 oz. The distribution of the observations is given by the following frequency table.

<u>Observed weight</u>	<u>Frequency</u>	<u>Percent</u>
76 lb 0 oz	107	25.57
76 lb 1 oz	221	48.68
76 lb 2 oz	126	27.75

A similar but much smaller study done in November 1975 produced similar results:

Sample size - 12

Mean of sample - 76 lb 0.75 oz

<u>Observed weight</u>	<u>Frequency</u>	<u>Percent</u>
76 lb 0 oz	5	41.67
76 lb 1 oz	6	50.0
76 lb 2 oz	0	0.0
76 lb 3 oz	1	8.33

Thus if these results are typical of all the bottling campaigns, a conservative 99+% confidence interval as the true amount of mercury contained in [REDACTED] bottles filled at Y-12 is:

(Note: This assumes a standard deviation of 1 oz.)

On the other hand, even if we take the ultraconservative position that the standard deviation is 10 oz rather than 1 oz, as is suggested by the data, a 99+% confidence interval becomes:

3.1.4 Amount of Mercury Shipped and Stored at Y-12

A total of [REDACTED] lb of mercury was bottled by the Y-12 Plant. The GSA conducted several sales of mercury, and Y-12 currently has an inventory of 6,404,900 lb (Ref. 6) (84,275 flasks) in storage for the GSA. The material is located in Building 9720-26 (Fig. 3.2).

3.2 QUANTITIES IN LITHIUM TAILS

3.2.1 Description of Material

Lithium is an alkali metal similar to sodium. The feed material used in the Y-12 process was lithium hydroxide, which is a caustic salt similar to sodium hydroxide, commonly called lye. This is the white salt that is the primary ingredient of household items such as Drano. Lithium has two major isotopes with atomic weights of 6 and 7. The content of ^6Li in nature is about 7.5% and ^7Li is about 92.5%. The Y-12 process was designed to separate these two isotopes and produce a product highly enriched in ^6Li . If the two isotopes were completely separated, this would leave over 12 times as much tails (^7Li) as product (^6Li). In order to achieve complete separation, a plant many times the size of the Y-12 facility would have been required and would have been economically unacceptable. Therefore, the ratio of tails to product [REDACTED]

The tails material was withdrawn from the system as a water solution of lithium hydroxide and temporarily stored in tanks. This solution contained small amounts of mercury since it had been in contact with lithium amalgam in the separation system. The storage tanks were routinely checked for mercury that settled from the aqueous solution. This mercury was drained off and returned to the process equipment. From the storage tanks, the solution was pumped to an evaporator where some of the water was boiled off so that the composition of the solution in the evaporator was a slurry containing about 10% solids.

This slurry was continually removed from the evaporator while fresh evaporator feed was being pumped into the evaporator. The slurry



Fig. 3.2. Mercury stored for GSA in the mercury warehouse (Building 9720-26).
(1983 photo)

was pumped into a continuous centrifuge where the "salt" (dry lithium hydroxide monohydrate) was removed. The mother liquor (or lithium hydroxide dissolved in water) was collected from the centrifuge and returned to the evaporator.

Samples of the tails salt were taken on a routine, periodic basis and sent to the laboratory for analysis. These samples had a mercury content of 8 to 16 ppm.

The tails materials were either put into indefinite storage at Portsmouth, Ohio, or were returned to industry on a prenegotiated "buy back" contract.

3.2.2 Estimate of Mercury Amounts and Basis Thereof

The mercury content in lithium tails varies from 8 to 16 ppm depending on the degree of retention of mercury in the material after processing. The concentration was determined by laboratory analysis. An average value of 12 ppm was used to determine the total mercury in tails.

3.2.3 Uncertainties and Confidence Statements

Laboratory data are no longer available for the mercury content in tails. An average of 12 ppm is considered to be a good value for estimating the total mercury in the tails. The tails stored at Portsmouth could have been sampled, but this was not accomplished because (1) many samples were required to be statistically significant, (2) there was potential for damage to the salts due to environmental exposure, (3) the cost of sampling, (4) time constraints, and (5) the small amount of total mercury involved.

3.2.4 Amount of Mercury in Lithium Tails

Total lithium tails produced was determined to be [REDACTED]. Analyses of lithium tails for mercury content varied from 8 to 16 ppm. However, the average was determined to be ~12 ppm/lb of mercury. Using this data, the mercury content was calculated as [REDACTED] * 12 ppm = [REDACTED] mercury.

3.3 QUANTITY REMAINING IN BUILDING 9201-4 (ALPHA-4)

3.3.1 Description and Nature of Problem

Building 9201-4 still contains the Colex process equipment but is empty of mercury that can be recovered by opening valves and draining equipment. However, a substantial amount still in the piping and equipment cannot be recovered until the facility is dismantled.

This mercury falls into two categories. The first is liquid metallic mercury that is caught in traps, between pipe flanges, under rubber linings, in low places of piping systems, and other small crevices occurring in a system of this type. The second source of

~~SECRET~~

was pumped into a continuous centrifuge where the "salt" (dry lithium hydroxide monohydrate) was removed. The mother liquor (or lithium hydroxide dissolved in water) was collected from the centrifuge and returned to the evaporator.

Samples of the tails salt were taken on a routine, periodic basis and sent to the laboratory for analysis. These samples had a mercury content of 8 to 16 ppm.

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3.2.4 Amount of Mercury in Lithium Tails

Total lithium tails produced was determined to be 115,526,285 lb (Ref. 8). Analyses of lithium tails for mercury content varied from 8 to 16 ppm. However, the average was determined to be ~12 ppm/lb of mercury. Using this data, the mercury content was calculated as
 $115,526,285 \text{ lb} \times 12 \text{ ppm} = 1,386 \text{ lb of mercury.}$

3.3 QUANTITY REMAINING IN BUILDING 9201-4 (ALPHA-4)

3.3.1 Description and Nature of Problem

Building 9201-4 still contains the Colex process equipment but is empty of mercury that can be recovered by opening valves and draining equipment. However, a substantial amount still in the piping and equipment cannot be recovered until the facility is dismantled.

This mercury falls into two categories. The first is liquid metallic mercury that is caught in traps, between pipe flanges, under rubber linings, in low places of piping systems, and other small crevices occurring in a system of this type. The second source of

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mercury is called "sludge." Sludge is the Y-12 jargon term for those salvage items that were solids or slurries that contained mercury and had to be processed in the Building 81-10 recovery equipment. Sludge includes such things as filter solids, cleanings from storage tanks and floor drains, [REDACTED] and gravel and dirt recovered from outside spills or leaks.

Some sludges, [REDACTED] appear to retain the mercury indefinitely; in other sludges, like tank cleanings, some of the mercury will slowly settle to the bottom. Prior to redrumming and sampling the sludge sold to the Mallory Battery Company in 1972, about 70,000 lb of liquid metallic mercury were recovered from the bottom of some of the sludge drums. These drums had been in storage about ten years, but the sludge material still showed a high mercury content. Presently, there are about 130 drums of this sludge material on hand; however, more is being collected in the cleaning of the Building 9201-4 sumps (see Fig. 3.3).

3.3.2 Estimate of Mercury Equipment Holdup

The June 1977 (Ref. 9) report shows an estimate of 100,000 lb holdup in process equipment. This number was based on two known facts. There were 262,000 lb drained from process equipment at Building 9201-5 during the stripping. There was more process equipment in Building 9201-5 than in Building 9201-4. Therefore, it was conservatively estimated that there would be at least 100,000 lb in the process equipment after draining the mercury for bottling. Currently, the estimate of process equipment holdup is being raised to 200,000 lb as a result of finding quantities of mercury that were not anticipated. During May and June, about 25,000 lb were collected from three locations [basement sump (Fig. 3.4), evaporator feed piping, and the storage tank that fed the bottling system]. In the latter case, the material was known to be there after the bottling campaign, but it was below the pump suction and was not going to be removed until the equipment was stripped.

3.3.3 Estimate of Mercury (Sludge)

The sludge that was sold to the Mallory Battery Company in 1972 came from two sources. One was the sludges removed from Building 9201-5 during stripping, and the other was the inventory collected at Building 81-10 when it was shut down in October 1962.

There are or will be three sources of sludge available when decommissioning of Building 9201-4 is complete.

1. Material in the outside sump (F-1150) at Building 9201-4.
2. Material known to be in the Building 9201-4 equipment.
3. Material on hand - ~130 drums (see Fig. 3.5).

The total amount contained in sludges is conservatively estimated to be in excess of 250,000 lb. Item 1 has been sampled and measured. The content has been calculated to be greater than 100,000 lb. Items 2

YIPH-213987

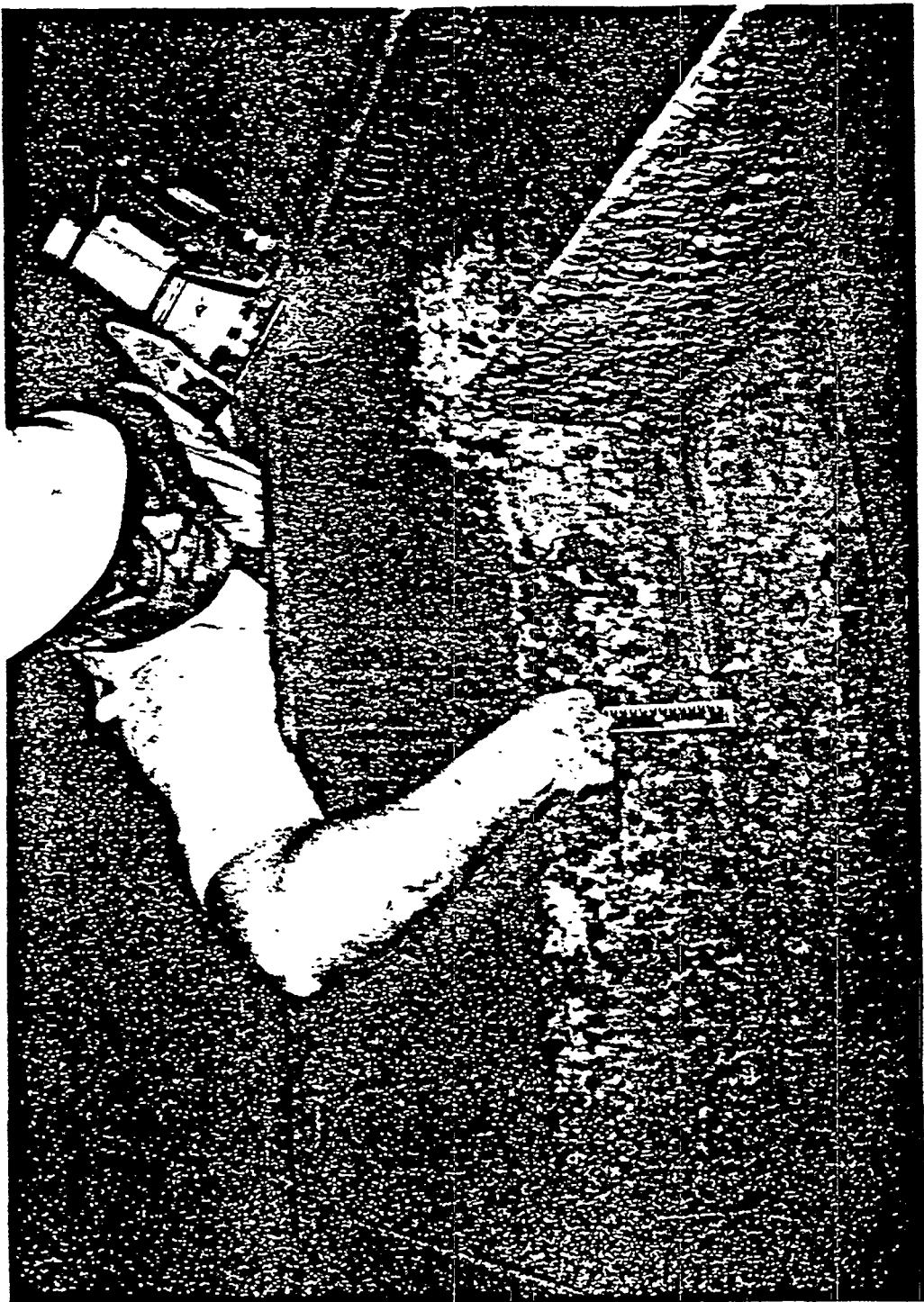


Fig. 3.3. Mercury sludge in collection tray in Building 9201-4.
(1983 Photo)

Y/PH-214011

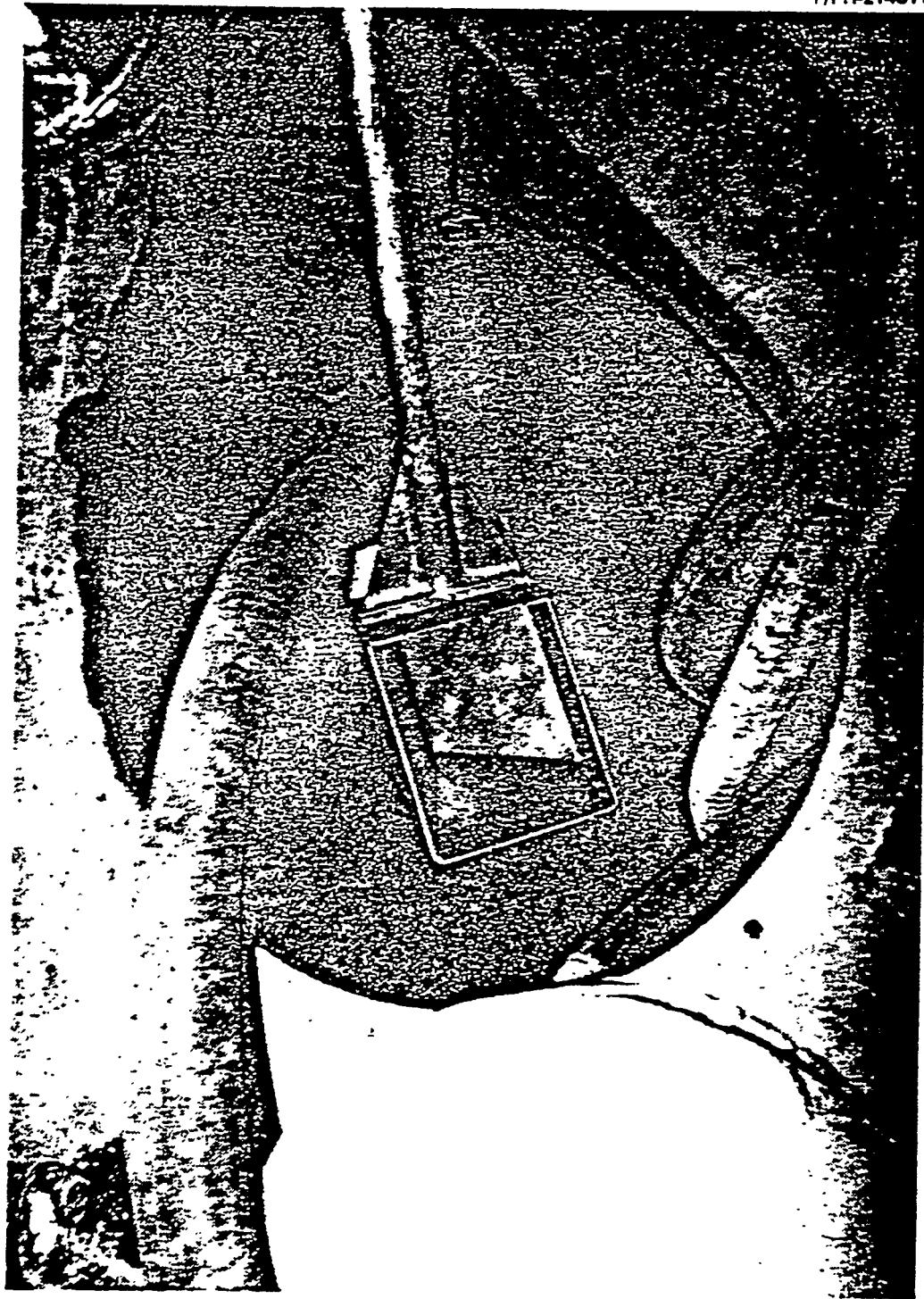


Fig. 34 Basement tank containing 6,000 lb of mercury in
Building 32014

Y/PH-213998



Fig. 3.5. Drums containing sludge in Building 9201-4.
(1983 Photo)

and 3 will yield a total in excess of 1,000 drums of material similar in nature to the 1,200 drums sold to the Mallory Battery Company. Although the Y-12 samples showed ~111,000 lb, it has been verbally reported by Mallory that they recovered 174,000 lb or more.

3.3.4 Uncertainties and Confidence Statements

The estimated amount of mercury recoverable from Building 9201-4 is felt to be conservative. The amount could be as high as an additional 50,000 lb recovered. The sludge may contain more mercury than anticipated, as was the case in the sale to the Mallory Battery Company. Metallic mercury also still remains in the drums and will be recovered prior to any salvage sale.

3.3.5 Amount of Mercury Remaining in Alpha-4

Building 9201-4 is estimated to contain 450,000 lb of mercury.

3.4 QUANTITIES SOLD TO MALLORY BATTERY COMPANY

3.4.1 Description of Sale

An invitation to bid for 1,270 drums of sludge containing mercury from lithium operations was issued to prospective bidders in 1972. A letter announcing the sale and providing information on the salvage material was sent to prospective bidders on September 2, 1971, and January 5, 1972. The sale was for the following salvage material (Ref. 10).

BID UCNC-2085 SALVAGE MATERIAL

<u>Lot no.</u>	<u>Drums</u>	<u>Weight (lb)</u>	<u>Description</u>
1	534	296,820	██████ solids
2	252	82,901	Carbonate filter solids
3	102	74,379	Process filter solids
4	72	44,259	Mixed dirt, sweeps, etc.
5	154	98,052	Process filter sludge
6	156	72,410	Sump sludge
TOTAL	1,270	668,821	

The Mallory Battery Company was the successful bidder.

3.4.2 Methodology of Estimate

Prior to offering the material for sale, ~70,000 lb of metallic mercury were drained from the drums. The material was repackaged and samples from ten random drums in each lot were mixed to form a composite sample that was offered to prospective bidders.

Samples from each lot were analyzed for mercury content prior to the bid on three occasions, and an estimate was made of the total mercury to be recovered by the successful bidder.

UCC-ND ESTIMATE OF MERCURY CONTENT

<u>Lot no.</u>	<u>No. of drums</u>	<u>% Mercury</u>	<u>Estimated weight (lb)</u>
1	534	5.0	14,841
2	252	9.5	7,900
3	104	45.0	34,306
4	72	7.5	3,319
5	156	32.5	32,157
6	<u>156</u>	<u>9.5</u>	<u>6,879</u>
TOTAL	1,274^a		99,402

^aA total of 1,270 drums actually sold.

The estimate of 99,402 lb (Ref. 6) was increased to 111,000 lb in the June 1977 report since the original estimate was felt to be conservative.

3.4.3 Uncertainties and Confidence Statement

Although significant effort was spent trying to estimate the amount of mercury in the sludge eventually sold to the Mallory Battery Company of Terrytown, New York, the nature of the material was such that good estimates were difficult to make. To further compound this, the Y-12 estimate was deliberately made more conservative than it would normally have been in order to attract bidders and to protect the government's interest when dealing with private industry. Thus it can be reasonably calculated that the 111,000 lb of mercury estimated to be in the sludge was probably significantly smaller than the true amount.

This speculation was supported by information obtained as part of the effort of preparing the present report. The Mallory Battery Company was contacted to find out how much mercury they had recovered from the sludge. They reported that to the best of their recollection, 174,000 lb had been recovered, although there was some uncertainty about the number. Ownership of the company has changed hands since the recovery operation, and the recovery records had been destroyed. An employee who had worked in the recovery operation, however, remembered the quantity of mercury recovered to be ~174,000 lb or more. If his memory of the mercury recovered is correct, the 174,000 lb should be a much better estimate than the 111,000 lb estimated by Y-12 because it would represent measurements made on pure mercury rather than measurements made on hard-to-measure sludge.

3.4.4 Amount of Mercury Sold to Mallory Battery Company

The Mallory Battery Company was contacted in June 1983 to request information on the amount of mercury actually recovered. Mallory data on the sale had been destroyed; however, one person involved in the sale recalled that they had recovered 174,000 lb, "maybe 200,000 lb," of mercury. This is in contrast to the 111,000-lb estimate used in the June 1977 report.

3.4.5 Quantities Recovered at Building 81-10

Building 81-10 mercury recovery operations were conducted from March 1957 through July 1962 (Ref. 11). Mercury was recovered by physical separation (draining) and by distillation in a Nichols-Hershoff furnace. Furnace operations were shut down in July 1962 (Ref. 12). Physical separation operations continued through September 1982. During the period of operation, over 13,760 drums of material were processed (Ref. 12). A summary of mercury recovered follows.

<u>Year</u>	<u>Total mercury</u>
1957	719,499
1958	1,189,734
1959	770,774
1960	442,397
1961	150,159
1962	<u>324,645</u>
 TOTAL	 <u>3,597,208^a</u>

^aThis total includes some mercury bottled after the Building 81-10 shutdown (Ref. 13).

Mercury recovered at Building 81-10 was returned to the operating inventory in the Colex process buildings.

3.5 QUANTITY OF OTHER KNOWN OR RECOVERABLE MERCURY AT Y-12

3.5.1 Stripping Operations, Building 9204-4

The Building 9204-4 Elex facility was shut down on March 16, 1956, and put into standby. All process equipment was opened and cleaned. The process solutions and mercury were transferred to the Colex facilities; 1,417,000 lb of mercury was transferred to the Colex production plants.

In September 1956 (Ref. 14), the decision was made to strip the process equipment from the building so that the space would be

available for other purposes. The H. K. Ferguson Construction Company was given the contract to strip the equipment. The area around 9204-4 was fenced, and the building was administratively removed from the Y-12 area so that noncleared personnel could be used in the stripping operations.

The entire building was stripped and returned to Y-12 control by December 1, 1956. The short time used and the magnitude of the task lead to the conclusion that the job was not accomplished in a detailed methodical manner. The major pieces of equipment that had been cleaned were removed individually and stored in the Y-12 salvage yard. Piping systems were cut into lengths that could be easily handled, thrown, or dropped into trucks and transferred to the Y-12 salvage yard. Undoubtedly, some mercury was in or on the equipment and piping at this time. The disposition of this mercury could have been any or all of the following:

1. Some could have been collected by laborers and returned to Y-12. There is no available record of this.
2. Some could have been swept into drain systems and lost to the environment.
3. Some could have been lost to the ground around Building 9204-4 and to the ground at the Y-12 salvage yard.
4. Most of the mercury left in the equipment would have been lost to the air during smelting of the scrap.

48 melting
Because of the number of items and the amount of pipe removed, it is estimated that about 5,000 lb of mercury were lost from the Y-12 inventory in this fashion and discharged into the air.

3.5.2 Stripping Operations, Building 9201-5

The Building 9201-5 Colex facility was stripped in 1965, 1966, and early 1967. This operation was accomplished using Y-12 maintenance personnel. An [redacted] mercury was bottled from the Building 9201-5 inventory. This was part of the total bottling campaign, up to that time, [redacted]. The difference was made up of inventory from Building 9201-4. The condition of the equipment at this time was considered to be less clean from a mercury standpoint than Building 9204-4 had been when stripping commenced. That is, the bulk of the mercury had been drained from the process equipment and bottled, but the equipment had not been opened and cleaned as was the case in Building 9204-4. In addition, the Colex process had an entirely different physical configuration that involved more piping, traps, and pumps, which could and did contain small pockets of mercury.

In the stripping of Building 9201-5, a crew of process operators was assigned to the Maintenance Department responsible for the job. The purpose of this crew was twofold. The first was to support the maintenance crew in draining and vacuuming up any residual mercury for

recovery, and the second was to sweep and clean the work areas to keep the air counts down to an acceptable level. During this stripping operation, more than 200,000 lb were collected and stored for future bottling. The 1966 process accident and subsequent loss of ~50,000 lb occurred while these stripping operations were in progress.

As was the case in Building 9204-4, some mercury adhered to the interior surfaces of the piping and process equipment. The disposition of this mercury would have been similar to that in Building 9204-4 with the exception that only a minimal amount could have gone to outside drainage. Any mercury on the floor would have ultimately been collected in the drain recovery system (see Fig. 3.6).

During the stripping operation there were instances when mercury was reported in the street paralleling the parking lot at the Bear Creek guard portal. Operators were sent to clean up this mercury with vacuum cleaners. This was residual mercury that had shaken or vibrated from the equipment and piping when being loaded and transported.

Because of the increased quantity of equipment removed from Building 9201-5, the quantity of residual mercury is estimated at 14,000 lb. However, recent information from a local scrap dealer indicates that he and another dealer who had bought this scrap recovered 54,000 lb of mercury therefrom.

25 smelting

3.6 SALVAGE SALES

3.6.1 Building 9204-4

Salvage from Building 9204-4 was not sold as surplus property or scrap. The scrap was smelted in a furnace erected by smelting contractors in the Y-12 Plant salvage yard area. A two-phase contract was awarded to Sidney Greenfield and David Witherspoon.

The first phase involved paying them a fee for smelting scrap. Large (~4-ton) ingots were formed from the metal. This material was stored at the Oak Ridge Gaseous Diffusion Plant (ORGDP) and was ultimately sold to a Japanese company.

In the second phase, the government sold the scrap metal to Greenfield and Witherspoon. After smelting, the metal was poured into standard industrial ingot molds and sold.

Any residual mercury not recovered by the contractors from the scrap prior to smelting was vaporized and went into the air from the furnace exhaust.

3.6.2 Building 9201-5

The AEC and Union Carbide jointly decided that it was more advantageous to sell mercury-contaminated materials salvaged from Building 9201-5 than to smelt the scrap. Sales were conducted between 1965 and 1978 (Ref. 15). Special conditions applicable to location, source material, and weights (approximate weights) were included as well as a statement that the lots (specified in each bid) had been exposed to mercury. Prospective bidders were advised that small

Y/Pt 214012



Fig. 3.6. Floor drain in Building 9201-4 similar to the drains used in Building 9201-5. (1983 photo)

particles : mercury might be found on the scrap. Scrap materials sales are summarized in Table 3.1. It has been reported that mercury was recovered from the scrap by local scrap dealers.

3.6.3 Uncertainty and Confidence Statements

There is uncertainty regarding the quantity of mercury removed from Buildings 9204-4 and 9201-5 because of bottling campaigns that included mercury from Buildings 9201-5 and 9201-4. Mercury was transferred from Building 9204-4 into the Colex plants, and the stripping was accomplished by an outside contractor. Mercury recovered during stripping (removal of equipment) was not documented and was returned to the Building 9201-4 inventory.

3.7 SUMMARY OF MERCURY ACCOUNTED FOR

3.7.1 Summary of Quantities

MERCURY ACCOUNTED FOR

<u>Disposition</u>	<u>Quantity (lb)</u>
Bottled and stored, return to GSA unopened	21,666,384
Stored in LiOH tails	1,400
Sold in Building 9201-5 scrap	14,000
Sold in sludge to Mallory Battery Company	174,000
Flask overage during bottling	17,212
Estimate in Building 9201-4 equipment	200,000
Estimate in Building 9201-4 sludge and sumps	250,000
Recovered from Building 9201-2 pipe	800
TOTAL ACCOUNTED FOR	22,323,796

particles of mercury might be found on the scrap. Scrap materials sales are summarized in Table 3.1. It has been reported that mercury was recovered from the scrap by local scrap dealers.

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MERCURY ACCOUNTED FOR

<u>Disposition</u>	<u>Quantity (lb)</u>
Bottled and stored, return to GSA unopened	[REDACTED]
Stored in LiOH tails	14,000
Sold in Building 9201-5 scrap	174,000
Sold in sludge to Mallory Battery Company	[REDACTED]
Flask overage during bottling	200,000
Estimate in Building 9201-4 equipment	250,000
Recovered from Building 9201-2 pipe	800
TOTAL ACCOUNTED FOR	[REDACTED]

Table 3.1. Mercury-contaminated materials handled through sales

Bid Invitation No.	Lot	Date	Material	Amount	Bidder
774	1	02/17/65	18 Tanks	Lot	Pitts Scrap Iron & Metal Company
822	18	12/06/65	Mixed ferrous scrap	Lot	Pitts Scrap Iron & Metal Company
19	12/06/65	Ferrous scrap	lot	Pitts Scrap Iron & Metal Company	
20	12/06/65	Miscellaneous	lot	Knoxville Junk Company	
<hr/>					
857	1-3	08/31/66	Drives		Empire Electric Company
	5-8	08/31/66	Drives		Empire Electric Company

Table 3.1 (Cont.)

Table 3.1 (Cont.)

COMPANY ADDRESSES

Lee Metals Corporation
11135 W. Canal Street
Milwaukee, Wisconsin 53233

David Witherpoon, Inc.
P.O. Box 806
Knoxville, Tennessee

Berman Brothers Iron & Metal Co.
2501 First Ave., North
Birmingham, Alabama 35202

Metropolitan Metals, Inc.
P.O. Box 1543
Harrisburg, Pennsylvania 17105

Pitts Scrap Iron & Metal Co.
15 Hill Ave.
Cookeville, Tennessee

COMPANY ADDRESSES

Commercial-London, Inc.
717 Highland Ave., NE
Atlanta, Georgia 30312

Chicago Metals Corporation
330 N. California Ave.
Chicago, Illinois 60611

**U. S. Reduction Company
4610 Melville Ave.**

Wolverine Metal Company
6500 E. Robinwood

Frankel Co., Inc.
19300 Filner Ave.
Detroit, Mich.

Knoxville Junk Company
822 Richards Street
Knoxville Tennessee 17

Samuel G. Keywell Co.
3075 Lonyo Avenue

Luria Brothers & Co., Inc.
Bldg. 2, 875 Greentree Road

Ferrar Brothers

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1. R. C. Armstrong, "Authorization for the Return of Solvent to GSA National Stockpile," Atomic Energy Commission, letter to J. P. Murray, Union Carbide Corporation, Nuclear Division, January 3, 1957.
2. D. W. Smith, "Mercury Bottling and Accountability Procedure - Arc Melting Department," File M-223, Mercury Task Force, Union Carbide Corporation, Nuclear Division, Oak Ridge Y-12 Plant, April 30, 1983.
3. Y-12 Plant Quarterly Report - Third Quarter, FY 1959, Y-1208, Union Carbide Corporation, Nuclear Division, Oak Ridge Y-12 Plant. SECRET-RD.
4. Y-12 Plant Quarterly Report - Second Quarter, FY-1963, Y-1219, Union Carbide Corporation, Nuclear Division, Oak Ridge Y-12 Plant. SECRET-RD.
5. M. R. Bradshaw, "Mercury Warehousing and Shipment Problems," Minutes of Meeting, File M-81, Mercury Task Force, Union Carbide Corporation, Nuclear Division, Oak Ridge Y-12 Plant.
6. "Mercury Task Force Audit Work Paper," File M-780, Union Carbide Corporation, Nuclear Division, Oak Ridge Y-12 Plant, June 1983. SECRET-RD.
7. "Mercury Bottling Log Book," File M-336, p. 101, Mercury Task Force, Union Carbide Corporation, Nuclear Division, Oak Ridge Y-12 Plant. CONFIDENTIAL-RD.
8. Alpha-5 Colex Operating Data, Y-12 Plant Records, Row 18, Tier 3, Box 14, Union Carbide Corporation, Nuclear Division, Oak Ridge Y-12 Plant. SECRET-RD.
9. J. M. Case, "Mercury Inventory at Y-12 Plant, 1950 Through 1977 (U)," Union Carbide Corporation, Nuclear Division, letter to H. D. Hickman, Energy Research and Development Administration, June 9, 1977. SECRET-RD.
10. Don McCammon, "UCNC - Property Sale No. 2085, Sale of Government-Owned Mercury Contaminated Material to Mallory Battery Company," File M-430, Mercury Task Force, Union Carbide Corporation, Nuclear Division, Oak Ridge Y-12 Plant, May 1972. ↗Y-1218
11. Y-12 Plant Quarterly Report, First Quarter, FY 1963, Y-1018, Union Carbide Corporation, Nuclear Division, Oak Ridge Y-12 Plant. SECRET-RD.

12. "Solvent Recovery Facility - Operating Cost and Mercury Recoveries, 1957 through September 1962," File M-68, Mercury Task Force, Union Carbide Corporation, Nuclear Division, Oak Ridge Y-12 Plant. Y/HG-0023 (0005)

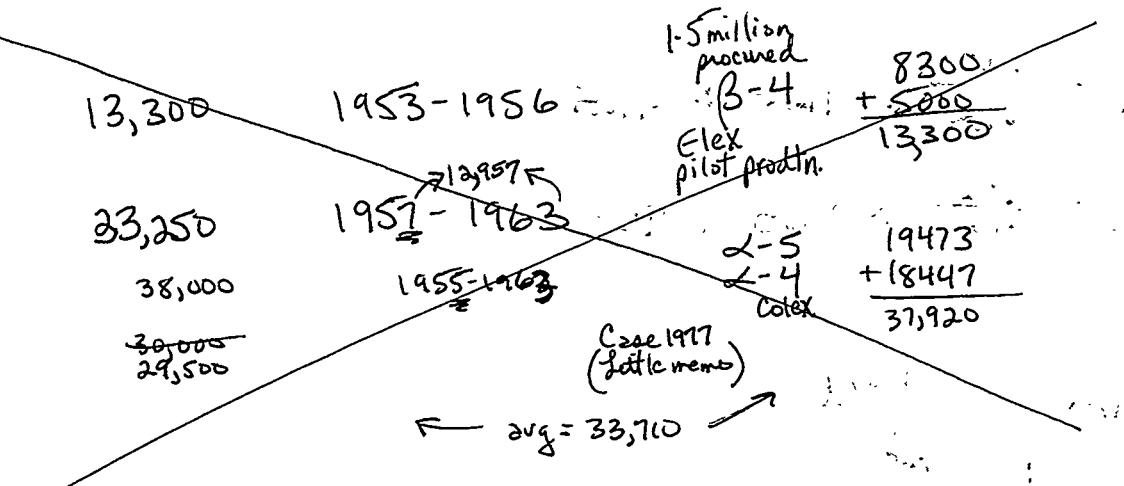
13. "Mercury Bottling Log Book," File M-75, Mercury Task Force, Union Carbide Corporation, Nuclear Division, Oak Ridge Y-12 Plant.

14. S. R. Sapirie, Beta-4 Plant Dismantlement (U), Atomic Energy Commission, ORO-81593, letter to C. E. Center, Union Carbide Corporation, Nuclear Division, October 4, 1956. SECRET-RD.

15. Jim Bailey, "Summary List of Bid and Acceptance From 1965 through 1979," File M-781, Mercury Task Force, Union Carbide Corporation, Nuclear Division, Oak Ridge Y-12 Plant.

**4. QUANTITIES OF MERCURY LOST OR
NOT ACCOUNTED FOR BY Y-12**

Phase I Air Loss Quantities



other times:

1950-1953?
 4?

?

23,500 lbs
'procured'

but...

108,000 lbs
 lost from L-2
 (spilled) (Case)
 3X

other bldgs:

→ 9733-1
 → 9733-2
 → 9201-2
 81-10
 9202

9720-26

1951-1954 Orex
 1950-1951 Elex pilot
 (L-2) 1950-1951 Elex pilot
 1957-1962 roasting soil
 recovered 3.6 million lbs.
 physical recovery
 TOTAL

1951-1954 Orex

Hg storage

PROCUR ED

24 million lbs
 - 1.5 million β-4 Elex
 - .023 million pilots

Loss to Air %

$$\frac{13,300}{1,500,000} = .009\%$$

22.5 million lbs Colex

$$\frac{38,000}{22,500,000} = .0017\%$$

$$\checkmark 1716 = \frac{.20}{.12} \times 11.25 \times 91.5$$

$$\checkmark 1029 = \frac{.06}{.12} \times 22.5 \times 91.5$$

$$\text{mg/m}^3 \quad \text{lbs/d}$$

$$\times \frac{\text{lbs}}{\text{mg}} \times \frac{\text{m}^3}{\text{d}} =$$

↑

2-4	2-5
1716	858
1287	2144
2573	2144
<u>3603</u>	<u> </u>
1888	2059
1716	858
1544	858
<u>1029</u>	<u>686</u>

$$1953-1956 \quad 15,356 + 9,607 = 24,963$$

$$+ \frac{8,300}{33,263} \quad \beta^{-4} \quad (33,250)$$

$$1957-1963 \quad 4117 + 8840 = 12,957 \quad (13,300?)$$

~~SECRET~~

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4. QUANTITIES OF MERCURY LOST OR NOT ACCOUNTED FOR BY Y-12

4.1 AIR LOSS QUANTITIES

4.1.1 Loss Mechanisms

Loss of mercury to air from the Colex process buildings, 9201-4 and 9201-5, occurred from multiple sources. The major sources were external venting of hydrogen as a by-product of the process, tank vents, and process seepage, leakage, and spillage within the building.

Hydrogen gas was a by-product of the amalgam-making process and amalgam decomposition. Hydrogen was collected, treated in a water bath to remove mercury, and vented outside the buildings. Mercury has been analyzed in the Colex hydrogen vent gas at 0.02144 mg/m^3 (Ref. 1). The total volume of hydrogen produced from Colex operations has been estimated at $2.2 \times 10^8 \text{ m}^3$. At this rate, the amount of mercury released by this stream is 10 lb.

It has been judged that the water bath scrubbing system reduced significantly the total mercury lost to the atmosphere through this stream. The characteristic blue color of the mercury spectra was not apparent during visual observations of the hydrogen flares.

Tank vents were judged to be an insignificant contributor of atmospheric mercury release because of the stagnant nature of the air in the tanks and the very low flow rates involved.

Process leaks and spills within the process areas were the major contributor to atmospheric mercury losses. The industrial hygiene monitoring program to monitor mercury concentrations within the breathing zones of the process areas is documented in Section 5.

In February and March 1956, the processes were shut down for an extensive cleanup of the process areas in Buildings 9201-4 and 9201-5. This cleanup reduced significantly the atmospheric concentrations of mercury within the process areas. Walls, windows, and floors, as well as the exterior of process equipment, were washed with a soap and sodium hypochlorite (Clorox) solution. Walls were painted and floors were waxed to minimize buildup of mercury on these surfaces and to ease future cleaning operations.

Elemental mercury has a vapor pressure of 0.001201 mm Hg at 20°C . Atmospheric emission rates of mercury are a function of vapor pressure, surface area, and rate of air flow over the source of mercury.

Mercury has a high surface tension; consequently, when spilled, as from a dripping flange, the impact of the drops on a hard surface tends to disperse the mercury into many smaller globules. This increases significantly the surface area of the original drop. The rate of evaporation is enhanced and, thus, the concentration in air. Spills or leaks under pressure make the situation worse. The ventilation rate of Buildings 9201-4 and 9201-5 was $\sim 2,386,000 \text{ ft}^3/\text{min}$. The high ventilation rates within the process buildings kept the concentration of mercury in the breathing zone at safe levels but also increased the total air loss to the environment.

~~SECRET~~

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betw. plant
and water.

Observations made of process building walls after painting indicated that elemental mercury could be observed; however, a magnification of 10 times was necessary to see the material. Consequently, large surface areas for mercury to volatilize were available, necessitating the continual washdown program.

The Elex process building, 9204-4, involved much smaller quantities of mercury, had few leaks/spills, had a high rate of ventilation, and was used for only a short period of time. Consequently, losses to the workplace air inside the building were significantly less than with the Colex process. On the other hand, the hydrogen gas vents from the process were not treated like the Colex off-gas to remove mercury, so the losses to the atmosphere were much higher--estimated to be 8,500 lb.

A consumable carbon arc furnace and an open hearth furnace were installed to the west of Building 9720-26 to melt scrap metal from the salvage yard. The furnaces were installed and operated in 1958 and 1959 under contract by Sidney Greenfield and David Witherspoon, scrap metal dealers. After 1959, the furnaces were disassembled and removed.

Materials from the dismantling of the Elex process in Building 9204-4 were processed in this operation. Scrap copper was melted in the open hearth furnace; steel, stainless steel, and nickel were melted and cast into ingots in the carbon arc furnace. No air pollution abatement equipment was installed. Contaminants, including mercury contamination of scrap metal, were discharged into the atmosphere. There was no attempt to recover or quantify these losses; however, it is estimated that 5,000 lb of mercury remaining in the scrap material from Building 9204-4 were lost to the air during the smelting operations.

The Colex pilot plant in Building 9201-2 had leaks and spills similar to the process operation in Buildings 9201-4 and 9201-5, only perhaps more per unit time because it was a pilot plant. The pilot plant was located in available space in the building with minimum modification to the building. Ventilation and spill containment was less than desirable, leading to the high air concentrations experienced.

sep.148

The mercury recovery facility (81-10) was an outdoor installation. A Nichols-Hershoff furnace burned mercury-bearing sludges, dirt, and other items and passed the off-gas through a condenser to recover mercury. The limited data on emissions do not allow for a good estimate of the quantity of mercury released to the atmosphere. The other release mechanism from this area would have been volatilization of spilled materials.

4.1.2 Methodology of Estimate

The quantity of mercury reported lost to the air in the June 1977 document is 30,000 lb. The basis for the 30,000-lb estimate can be found in Reference 2.

Little's study entailed taking a series of readings at all points at which air was exhausted from contaminated areas of the building. Pounds of mercury lost per day were calculated for each of the

17 points considered. A summation of the individual losses across all points gave a total of 22.5 lb of mercury lost per day through the exhaust facilities of the building.

The estimate for airborne losses given in the 1977 document was calculated as follows:

<u>Total Y4's</u>	<u>Building 9201-5</u>	$\frac{16.4}{16.4 \text{ vs. } 17} = 1.0$	$\frac{4.4}{91.5} = 0.047$	$400 \text{ days at } 20 \text{ lb/day}$	$+ 1,100 \text{ days at } 5 \text{ lb/day} =$	$13,500 \text{ lb}$
	<u>Building 9201-4</u>	$\frac{2.7}{11.1} = 0.24$	$\frac{12}{91.5} = 0.13$	$250 \text{ days at } 20 \text{ lb/day}$	$+ 2,200 \text{ days at } 5 \text{ lb/day} =$	$16,000 \text{ lb}$
<u>26.7 vs. 31</u>			$\frac{24}{91.5} = 0.26$	$(25) \frac{11.1}{11.1} = 1.0$	TOTAL	29,500 lb

In the current investigation, a new estimate of the quantity of mercury exhausted per day during a given quarter was redeveloped in the following manner:

$$\left[\begin{array}{l} \text{Estimate of pounds lost} \\ \text{during a quarter} \end{array} \right] = \left[\begin{array}{l} \text{Building avg. in mg/m}^3 \\ \text{for quarter} \\ \hline \text{Building avg. at time of} \\ \text{Little's survey} \end{array} \right] \times \left[\begin{array}{l} \text{from where?} \\ \\ \text{Estimated lb of Hg exhausted} \\ \text{per day at time of Little's} \\ \text{survey} \end{array} \right] \times \left[\begin{array}{l} \text{Avg. number of days in} \\ \text{a quarter} \end{array} \right]$$

where

1st week of Feb 1956 in A-5

Building average at time of Little's survey = 0.12 mg/m^3

Estimated pounds of mercury exhausted per day = $22.5 \text{ (beginning with last quarter of 1956)}$

= $11.25 \text{ (before the last quarter of 1956)}$

Average number of days per quarter = 91.5

Assumptions Made in Calculating Air Loss in Building 9201-5

Summers?

1. It is assumed that the ratio of the average air count in a given area of the building to the overall building average remains relatively constant from quarter to quarter.
2. Before the new ventilation system was complete in the last quarter of 1955, the exhaust rate is assumed to be one half of the new exhaust rate.

Remember the
Rousseau's procedures

A new exhaust system (see Fig. 4.1) was completed in Alpha-5 by the fourth quarter of 1955 to increase the air flow and thus decrease the air counts. The air counts dropped by approximately one half soon after the new ventilation system was completed, although it is not certain whether this drop was entirely due to the increased ventilation. ↓ ventilation (clean-up program)

3. It is assumed that the exhaust rates did not change significantly when the noisy fans in the tray rooms were replaced in the first quarter of 1959. tip speed ↓
4. It is assumed that all the fans in Building 9201-5 operated 24 h/d for 365 d/year. If some fans were turned off during the cooler months, the estimated losses would be significantly affected.
5. It is assumed that essentially no mercury was lost to the air after the facility stopped operating.
6. The air count data are assumed to be a representative sample. If all air count data were taken during the day-shift hours, the results are probably biased high because the air counts would be expected to drop during the cooler night hours.

25=24 | Since no documentation similar to that provided in Little's memo for Building 9201-5 could be found for Building 9201-4, the major uncertainty is that Building 9201-4 was assumed to be essentially identical to Building 9201-5, except that it operated for a longer period of time. The validity of this assumption is not known, but it had to be made in order to estimate the quantity of mercury lost. Mercury was undoubtedly lost through the air in other buildings, but the amount is difficult, if not impossible, to quantify. A memo (Baumann to Whitson, October 28, 1953) stated that the quantity of mercury lost through the tray vent system in Building 9204-4 was estimated to be 8.6 lb/d. If we assume that the quantity lost per day is the same during every day of operation, the total mercury lost through the tray vent system in Building 9204-4 was ~8,300 lb. It is believed that this quantity is not included in the 30,000-lb estimate given in the 1977 document. Measurable quantities of mercury must have been lost through the air in other buildings such as 9733-2, 9733-1, 9201-2, and 81-10, but the quantity cannot be estimated from available data.

b-4 |

4.1.3 Final Estimate of Air Loss

The total quantity of 19,473 lb of mercury lost from Building 9201-5 estimated by the above procedure is ~6,000 lb greater than the estimate given in the 1977 document.

No documentation similar to that provided in Little's memo for Building 9201-5 could be found regarding mercury exhausted in Building 9201-4. If one assumes that the mercury exhausted in

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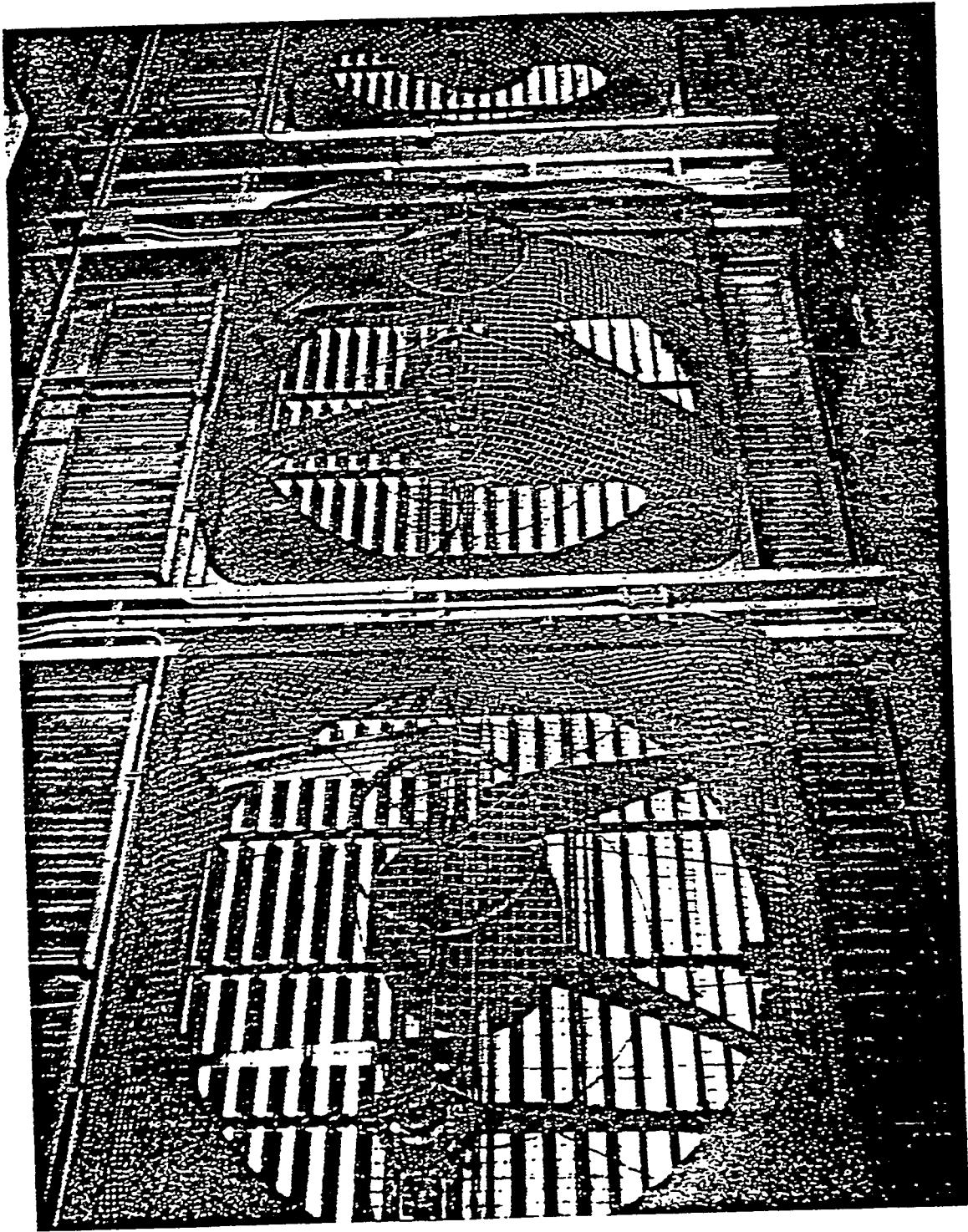


Fig. 4.1. New exhaust system added to Building 9201-5 during 1955.
(1955 photo)

Building 9201-4 was at the same rate as that exhausted in Building 9201-5, the total quantity of mercury lost through the air in Building 9201-4 is estimated to be 18,447 lb. Thus the estimated total amount exhausted from Buildings 9201-5 and 9201-4 was ~38,000 lb.

Losses from smelting operations of Building 9204-4 scrap are estimated at 5,000 lb and Building 9204-4 at 8,300 lb.

ESTIMATE OF AIR LOSSES

<u>Source</u>	<u>Quantity (lb)</u>
Buildings 9201-4 and 9201-5	38,000
1959 Smelting Scrap 9204-4	5,000
1956 Building 9204-4	<u>8,300</u>
TOTAL	51,300

4.1.4 Losses as a Function of Time

The following information represents revised estimates of air losses by quarter in Building 9201-5.

<u>Comment</u>	<u>Yr</u>	<u>Qtr.</u>	Y-12 Quarters		<u>Estimate of Hg exhausted (lb)</u>
			<u>Hg building avg. (mg/m³)</u>	<u>From future? Y/HG-106</u>	
Operation begins	55	1	.20	✓	1,716 ✓
		2	.15	?	1,287
		3	30/30/26	.30 ✓	2,573
		4	21/19/18	.21 ✓	3,603
10/24/55 New ventilation system complete	56	1	15/10/8	.11 ✓	1,888
		2	7/8/8	.10 ? hi	1,716
		3	8/7/6	.09 ? hi	1,544
	10	4	7/5/5	.06 ✓	1,029 ✓
Ventilation survey by Little	57	1	4/4/4	.04 ✓	686
		2	4/4/3	.04 ✓	686
		3	4/3/3	.03 ✓	515
Noisy fans replaced in tray rooms	57	4	2/3/2	.02 ✓	343
Operation ends	58	1	2/2/2	.02 ✓	343
		2	3/2/2	.02 ✓	343
		3	2/2/2	.02 ✓	343
		4	2/3/3	.02 (S/b.03)	343
TOTAL	59	1	4/3/4	.03 (S/b.04)	515
Started 3-13-59, shutdown 9/20	1959	2	5/7/4	.05	858
		3	4/5/4	.04	686
		4	3/4/3	.03	515
1960	1	4/2/2	.03	515	
		2	4/3/5	.04	686
		3	5/5/4	.05	858
		4	3/3/3	.03	515
not stripped until 1965!					

The following information represents revised estimates of air losses by quarter in Building 9201-4.

<u>Comment</u>	<u>Yr</u>	<u>Qtr.</u>	<u>1-12 Quarters</u>	<u>Estimate of Hg exhausted (lb)</u>
			<u>Hg building avg. (mg/m³)</u>	
Operation begins	55	2	.10	858
		3	32/20/19.25	2,144
		4	19/18/22.25	2,144
New ventilation system complete*	56	1	16/10/6.12	2,059
		2	4/4/4 .05	858
		3	5/4/3 .05	858
	25	4	4/4/4 .04	686
	57	1	4/4/3 .04	686
		2	3/3/4 .03	515
		3	3/2/3 .03	515
		4	2/2/2 .02	343
	58	1	2/2/2 .02	343
		2	2/3/4 .03	515
		3	5/3/3 .04	686
		4	2/3/2 .02	343
Exhaust rates cut in half during first and fourth quarters	59	1	i.e. 3/3/2 .03	258
		2	3/3/3 .03	515
		3	3/4/3 .03	515
		4	2/2/2 .02	172
	60	1	2/2/2 .02	172
		2	i.e. 2/3/3 .03	515
		3	4/3/3 .03	515
		4	2/2/3 .02	172
	1961	1	3/2/2 .02	172
		2	2/2/2 .02	343
		3	2/2/2 .02	172
		4	.02	343
	1962	1	.02	172
		2	.02	343
		3	.02	343
Operation ends		4	.02	172
TOTAL				18,447

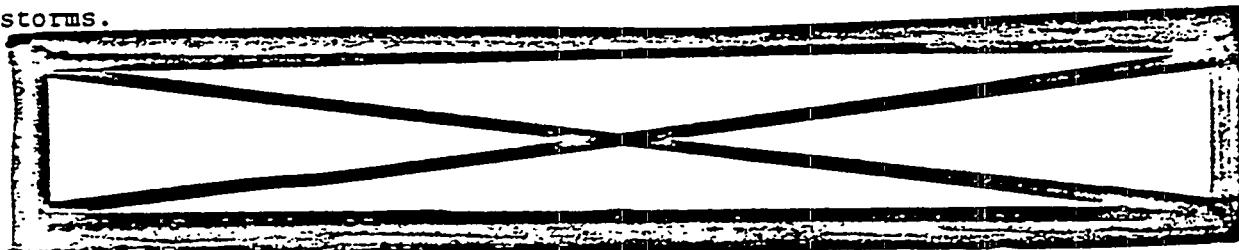
*It is estimated that the ventilation system work in Building 9201-4 lagged a quarter behind that of Building 9201-5.

4.2 WATER LOSS QUANTITIES

4.2.1 Loss Mechanisms

The primary loss mechanism to East Fork Poplar Creek from the main process buildings (9201-4 and 9201-5) was through the storm sewer system. Process areas within these buildings were designed to contain and collect process losses from leaks and spills in a floor drain system that fed into collection tanks within each process building. The liquid overflow from the first collection tank fed a second collection tank (in series). Mercury collected was routinely removed. Overflow from the second tank went into a sump adjacent to the building. A weir was installed in the Building 9201-4 sump, and samples were taken starting in May 1956. Overflow from this sump entered the storm sewer system.

The secondary loss mechanism from the main process buildings was also through the storm sewer system and involved mercury that had escaped from the process area floor drain system. The major portion of this loss mechanism was mercury that had entered the fan rooms from uncontained spills, condensation, equipment grease, and subsequent leakage within hollow walls and other undetermined sources. The balance was from spills and losses external to the process buildings which was washed into the storm sewer system during rainfall and storms.



Mercuric nitrate is very soluble in water (Ref. 4). Neutralization, however, would have formed mercuric oxide, which is only slightly soluble and forms a yellow precipitate at a concentration above 50 ppm. Mercuric oxide formed in this manner in the dilute concentrations involved here does not settle readily, and flowing water would keep it in suspension. When in suspension, acid discharges would readily resolubilize the precipitated oxide. This could have occurred by acid discharges of other processes. Consequently, during occasional acid-dominated periods, a major portion of the mercury loss to East Fork Poplar Creek would have been in the soluble form.

Elemental mercury released was most likely to have been sorbed on finely divided particulate matter, both organic and inorganic, that would have been easily transported. While elemental mercury is generally considered to be insoluble in water, it is soluble in distilled water to the extent of ~25 ppb (Ref. 5). Solubility increases in aerated water and with increasing concentrations of oxidants and halides. Also, elemental mercury can be transported in rapidly flowing water in colloidal suspension.

Sodium hypochlorite, an oxidant, was used in building washing solutions, which increased solubility of mercury (HgCl_2 36 g/L) (Ref. 4). This release was through the floor drain system.

The Elex and Colex pilot operations in Building 9201-2 released mercury through building sumps leading directly to East Fork Poplar Creek. Water was used to cover the floor in the Colex pilot plant in order to reduce atmospheric concentrations of mercury. This water was discharged into East Fork Poplar Creek. Spills in this building that were not contained and collected went into the dirt under the foundation. From there, mercury made its way to the building sump and to the atmosphere, raising air concentration in the building.

The Mercury Recovery System in Building 81-10 was installed to recover mercury from sludges, dirts, etc. When originally installed, there was a containment system for spilled mercury and mercury-contaminated sludges which flowed into a sump. The effluent from the sump flowed into the industrial ditch and ultimately into East Fork Poplar Creek. The form of release from this operation was most likely elemental mercury and probably associated with fine particulate matter. The materials from the 81-10 area that were likely to sorb mercury were dust, dirt, sludges, [REDACTED] In 1958, a secondary large sump was installed across the road. Feed material to the recovery system was stored under a shed roof on a concrete pad.

4.2.2 Methodology of Estimate

The East Fork Poplar Creek has been monitored for mercury contamination since the early 1950s. This monitoring consisted of routine sampling for laboratory analysis of mercury concentration and routine stream flow measurements. The quantity of mercury lost to East Fork Poplar Creek was estimated using the data available from this monitoring.

The mercury concentration data used in obtaining the loss estimate consisted of reported concentrations for samples obtained at the east end of the Y-12 Plant during the period from April 1954 to September 1982. The concentration data used for the loss estimate were obtained from a letter dated December 10, 1982, from G. G. Fee, Y-12 Plant Manager to H. D. Hickman, Department of Energy, Oak Ridge Operations (DOE-ORO). The exact sampling location for this data changed with the construction of New Hope Pond in 1963. Prior to the construction of New Hope Pond, the samples were taken in the vicinity of what is now the inlet to New Hope Pond. When the pond was completed, the sampling location was changed to the outflow of New Hope Pond.

Various sampling techniques were used throughout this time period. There is some uncertainty as to what sampling methods were used to obtain specific concentration measurements. The concentrations reported for the period from December 1977 to September 1982 are believed to be from weekly grab samples. The concentration data prior to December 1977 are believed to result from weekly or monthly composite samples.

The analytical procedures used to determine the mercury concentration varied during the period from April 1954 to September 1982. A key difference in analytical procedures is that during the period from January 1974 to June 1977 the samples were analyzed for only soluble mercury; all other samples were analyzed for total mercury content.

*6-13-55
flow rate/
daily/
weekly
(YHGS-77,79)*

The stream flow data used in the estimates of mercury lost to East Fork Poplar Creek were obtained by use of a weir on East Fork Poplar Creek. Prior to the construction of New Hope Pond, a weir located upstream of the New Hope Pond site was used to measure the stream flow rate. The average quarterly flow rate was reported in the Y-12 Plant Quarterly Reports. These reports were the source of flow rates used to estimate the loss from fourth quarter 1955 to 1963. The construction of New Hope Pond in 1963 included the installation of a 6-ft Cipolletti weir at the outflow of the pond. Upon completion of the pond, this weir was used for East Fork Poplar Creek flow measurements. The average quarterly flow rates continued to be reported in the Y-12 Plant Quarterly Reports. These reports were the sources for flow rates used to estimate losses from 1963 to 1970. More detailed data were available for flow rates observed from 1971 to 1982. These data included monthly average flow rates for the period January 1971 to March 1978 and monthly maximum, minimum, and average flow rates for the period from April 1978 to April 1983.

The material lost to East Fork Poplar Creek was estimated by pairing the available average stream flow rate with the corresponding average mercury concentration for a given time period. Because of the form of the available stream flow rate data, quarterly estimates of the loss were obtained for the period from fourth quarter 1955 to fourth quarter 1970, and monthly estimates were obtained from January 1971 to September 1982. Both the flow rate data set and the mercury concentration data set contained time periods with missing data. This prevented the direct estimation of losses for the following time periods: second quarter 1961; second quarter 1963; second quarter and third quarter 1966; June, July, and August 1971; January, February, March, April, September, October, November, and December 1973; November and December 1974; and February 1982.

For the time periods where the necessary data were available, the mercury losses were estimated using the following equation:

$$\begin{aligned} l = & \left(\bar{x} \text{ mg/L} \times \frac{1}{1,000 \text{ mg/g}} \times \frac{1}{453 \text{ g/lb}} \times 3.7853 \text{ l/gal} \right) \times \\ & \left(1,000,000 \times \bar{y} \frac{\text{million gal}}{\text{day}} \times k \frac{\text{days}}{\text{time period}} \right), \end{aligned}$$

where

\bar{x} = the average mercury concentration for the time period in mg/L,

\bar{y} = the average stream flow rate for the time period in million gal/day,

k = the number of days in the time period,

l = the mercury loss in pounds.

A large number of the mercury concentration values reported by the laboratory was of the form ($<C$) where C is the minimum detectable limit for the particular analytical procedure used on the samples. If one uses the minimum detectable level in the loss estimates when actually there was a much lower concentration in the sample, an overestimation of loss results. To evaluate the magnitude of the problem created by the "less than" reporting, two sets of estimates were calculated. One calculation replaced the "less than" value with the minimum detectable level, and the other calculation replaced the "less than" value with zero. The estimate for total mercury loss using the minimum detectable level was 216,749 lb, and the estimate for total mercury lost using zero was 210,585 lb.

A procedure to estimate missing data was developed to enable estimates to be made of mercury losses to East Fork Poplar Creek for the time periods where either concentration or flow rate data were not available. Because of the seasonal variation in flow rates which, assuming a constant mercury loss rate, also affect mercury concentration values, the missing data were estimated by averaging available data for corresponding time periods in other years. Missing flow rate data for 1961 were estimated using available data from 1954 to 1966, and missing flow rate data for 1971, 1973, and 1974 were estimated using available data from 1966 to 1982. Missing mercury concentration data for 1963 and 1966 were estimated using available data from 1963 to 1966. Because of the high percentage of mercury concentration reported as "less than" values for the samples submitted in the early 1970s, the missing concentration data for 1971, 1973, and 1974 were estimated by the current "less than" value in use during that time period.

Variance estimates for the mercury losses to East Fork Poplar Creek were also calculated. These estimates were obtained using the formula for the variance of a product of two random variables. For two independent random variables X and Y, the variance of their product is expressed as:

$$\text{VAR}(XY) = E^2(X) \text{ VAR}(Y) + E^2(Y) \text{ VAR}(X) + \text{VAR}(X) \text{ VAR}(Y) .$$

This quantity can be estimated using observed sample means and sample variances as follows:

$$\text{A} \\ \text{VAR}(XY) = \bar{X} s_y^2 + \bar{Y} s_x^2 + s_x^2 s_y^2 .$$

In the current situation, the random variables of interest are mercury concentration and stream flow rate. Individual sample results were available in the mercury concentration data. These were used to estimate the within-quarter and within-month variation for mercury concentration. Because of the different analytical methods used and apparent changes in variability from 1955 to 1982, several estimates of mercury concentration variance were determined using the data collected during specific time periods. These variance estimates are summarized in Table 4.1.

Table 4.1. Estimates for the variance in mercury concentration observed in East Fork Poplar Creek

Time period	Variance (mg/L) ²
1954-1957	(0.85797) ²
1958	(2.31744) ²
1959-1966	(0.24177) ²
1967-1973	(0.06628) ²
1974-1977	(0.02212) ²
1978-1982	(0.00264) ²

Individual daily flow rate data were not available; hence the variance in flow rate observed within a month or quarter could not be directly estimated. For each month in the five-year period from April 1978 to April 1983, the minimum flow rate for a 24-h period and the maximum flow rate for a 24-h period were available. These were used to obtain the range in flow rate within a month. The variance in flow rate was then estimated by the following equation:

$$\text{Variance} = \left(\frac{\text{Range}}{4} \right)^2 .$$

The maximum estimated variance thus obtained was (5.825 million gal/d)². The variance for total mercury lost was calculated using this maximum flow rate variance; the resulting standard deviation for total mercury lost was 12,179 lb. The sensitivity of this estimate to changes in the estimated flow rate variance was evaluated by completing a second calculation of the variance for total mercury lost using zero as the flow rate variance. The resulting standard deviation for total mercury lost was 11,667 lb. Because of the relative insensitivity of the variance estimation to the flow rate variance, the (5.825 million gal/d)² was used as the variance estimate for all the flow rate data.

Estimates of mercury losses to East Fork Poplar Creek are available for the time period from the fourth quarter 1955 through September 1982. With the exception of the period from January 1974 to June 1977, all estimates are for total mercury lost. During the period from January 1974 to June 1977, the estimates represent losses of soluble mercury.

4.2.3 Final Estimate of Loss to Water

The estimates of mercury lost to East Fork Poplar Creek are summarized in Table 4.2 for the period of the fourth quarter 1955 to the fourth quarter 1982. The limits associated with the number in the table are ± 2 standard deviation limits.

Table 4.2. Summary of mercury losses to East Fork Poplar Creek
Fourth Quarter 1955-September 1982

	<u>Estimated losses in pounds</u>	
	<u>Less than at minimum detectable value</u>	<u>Less than at zero</u>
Total mercury losses where complete data were available	216,438 \pm 24,357	210,572 \pm 24,355
Soluble mercury losses 1974-June 1977	311 \pm 530	13 \pm 528
Total mercury losses for periods with missing data	2,118 \pm 2,627	1,868 \pm 2,627
Soluble mercury losses for periods with missing data (1974-1977)	2 \pm 138	0 \pm 138
Total losses	243,373 = 218,869 \pm 24,504	212,453 \pm 24,502 = 236,955

During the period from January 1974 to June 1977, the water samples from East Fork Poplar Creek were only analyzed for soluble mercury. The estimated soluble loss for this time period, assuming less-than values at the minimum detectable level, was 313 lb. No attempt was made to estimate the loss through suspended mercury. There is no evidence of activities at Y-12 that would have led to unusual mercury losses during this time period. Considering the losses estimated for the years immediately preceding 1974 and following 1977 (Table 4.4), it appears reasonable to assume that suspended losses from January 1974 to June 1977 would have been less than 1,000 lb.

This estimate of 218,869 lb is in contrast with the 470,000-lb estimate in the Y-12 1977 mercury inventory report. In that report, an estimate of 235,000 lb "lost" to the creek was reported which then was doubled (to 470,000) to account for the assumption made that the lab

actually used throughout the period show that, except for the 1974-1977 period discussed in the last paragraph, the analytical procedures did in fact measure total mercury and not only the soluble mercury. In the opinion of the 1983 Task Force, the 218,869 lb is a better estimate of the quantity discharged taken together with the additional quantities discussed in the paragraphs following.

It is important to note that these estimates of losses to East Fork Poplar Creek only account for mercury losses represented in the samples obtained from Poplar Creek. Data on the adequacy of the sampling procedure for detecting bulk losses of mercury are not available. Interviews with personnel employed at Y-12 during the 1950s indicate that at times beads of mercury could be seen on the stream bottom. It is not known how much of this type of stream loss is represented in the mercury concentration samples. However, attempts have been made to apply correction factors to these data. The total estimated release to East Fork Poplar Creek is in Table 4.3. The rationale for these estimates is presented in the following sections.

8/10?
Table 4.3. Mercury released to East Fork Poplar Creek - Process Waste

1950-1954	Correction factor	11,300 lb
1955-1982	Soluble and suspended	218,869 lb
	Metallic mercury and bottom materials	7,500 lb
	Storm effects factor	<u>1,275 lb</u>
	TOTAL	238,944 lb
		<i>c/b 215 K</i>

4.2.3.1 1950-1954 Correction Factor

*what about
1953, 54
and plant yrs? 1955?*

Since measured mercury releases start in 1955, an estimate of the mercury released needs to be made for the period of 1950 to 1954 because data do not exist, either on creek flow or mercury concentration.

Estimated Mercury Inventory

1950
1951
1952
1953
1954



7/16-0437

~~SECRET~~

118

actually used throughout the period show that, except for the 1974-1977 period discussed in the last paragraph, the analytical procedures did in fact measure total mercury and not only the soluble mercury. In the opinion of the 1983 Task Force, the 218,869 lb is a better estimate of the quantity discharged taken together with the additional quantities discussed in the paragraphs following.

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	TOTAL	238,944 lb

4.2.3.1 1950-1954 Correction Factor

Since measured mercury releases start in 1955, an estimate of the mercury released needs to be made for the period of 1950 to 1954 because data do not exist, either on creek flow or mercury concentration. This methodology for this estimate is based on the estimated mercury inventory in the Y-12 Plant from 1950 to 1954 based on the mercury capacity estimates of the development and pilot facilities in operation at that time. The mercury inventory from 1950 to 1954 is estimated as follows:

Estimated Mercury Inventory

1950	4,000 lb
1951	8,000 lb
1952	40,000 lb
1953	162,000 lb
1954	241,000 lb

~~SECRET~~

Assuming a loss rate of 2.5% of inventory per year because of the pilot activities going on, the estimate loss to East Fork Poplar Creek would be:

Estimated Loss to East Fork Poplar Creek

1950	100 lb
1951	200 lb
1952	1,000 lb
1953	4,000 lb
1954	<u>6,000 lb</u>
TOTAL	11,300 lb

4.2.3.2 Metallic Mercury and Bottom Correction Factor

Prior to the construction of New Hope Pond in 1963, metallic mercury had been observed in East Fork Poplar Creek. A correction factor for this was developed based on the mercury buildup in sediments observed since New Hope Pond was constructed (~15,000 lb of mercury in 20 years or about 750 lb/year average).

The major release of mercury was between 1954 and 1959 (six years); therefore, the quantity of materials released to East Fork Poplar Creek were probably higher than the present rates.

With the daily acid pulses in the creek observed at this time period, it is estimated that much of the insoluble mercury that would have settled in the creek would have been resolubilized. Also, since flow rates were about one-third greater than the current rates (~11-Mgd rate as compared to the current 8-Mgd rate observed), less settling of suspended solids was likely to occur in the creek. The higher level of suspended solids and soluble mercury would appear in the sampling system and would have been reported.

A correction factor for metallic mercury and bottom factors of 1 2/3 was applied to the present average annual buildup of mercury in New Hope Pond sediments (750 lb/year) for the six-year period (1954-1959) resulting in a 7,500-lb correction factor estimate.

4.2.3.3 Storm Effects Correction Factor

A correction factor for storm effects was made for the period of 1963 through 1982 because samples were collected on a time-proportional basis rather than a flow-proportional basis.

The basis for determining this correction factor was derived from analysis of weekly grab samples taken since December 1977 (Refer to Sect. 6). Excluding the March 15, 1982, storm because it is a statistical outlier, the mercury flux is about 13% greater for a rain event. The total mercury loss from 1963 through 1982 was multiplied by 13% to develop a storm effects factor to account for additional mercury probably released from New Hope Pond.

Assuming a loss rate of [REDACTED] because of the pilot activities going on, the estimate loss to East Fork Poplar Creek would be:

Estimated Loss to East Fork Poplar Creek

1950	100 lb
1951	200 lb
1952	1,000 lb
1953	4,000 lb
1954	<u>6,000 lb</u>

TOTAL 11,300 lb

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4.2.4 Losses as a Function of Time

The estimated mercury lost to East Fork Poplar Creek is summarized by quarter in Table 4.4. The estimated losses in the table assume that all laboratory results for mercury concentration reported as "less than" the detectable level are really at the minimum detectable level. The average mercury concentration and the average flow rate for each quarter are also provided in Table 4.4.

The data presented in Table 4.4 are graphically displayed in Figures 4.2, 4.3, and 4.4.

4.3 SEDIMENT LOSS QUANTITIES

4.3.1 Loss Mechanisms

New Hope Pond was built in 1963 to provide 24-h retention of liquids from the industrial ditch in order to provide for pH equalization prior to discharge into East Fork Poplar Creek. This retention proved to be beneficial in that it also allowed for settling of particulate matter. Since mercury tends to sorb on finely divided particulate matter, this settling period allowed substantial amounts of mercury-contaminated substances to settle in New Hope Pond. Coal fines from the coal pile and dirt flushed by storms provide the material for mercury to adhere upon. Core samples taken have verified this. Recent data [draft report, Sources and Discharges of Mercury in Drainage Waters From the Y-12 Plant, Fall 1982 (U), Turner, Kamp, 1983] indicate that approximately one half of the mercury-contaminated material entering New Hope Pond settles out during normal flow. Other observations indicate that as the influent loading of suspended solids increases, the ponds become more efficient at settling.

New Hope Pond was dredged in 1973, resulting in removal of $\sim 19,000 \text{ m}^3$ of sediment. Presently, New Hope Pond sediment buildup is in the same order of magnitude. Core samples taken before the dredging, and again in 1982, indicate approximately the same mercury concentration, average about 125 ppm, ranging from 640 to 29 ppm.

Prior to 1963, mercury released from the plant was transported from the industrial ditch directly to East Fork Poplar Creek and settleable solids contaminated with mercury can be found in sediments in East Fork Poplar Creek and its floodplains.

4.3.2 Methodology of Estimate

4.3.2.1 Sediment Presently in New Hope Pond

Two sets of core sampling data are available for the sediment in New Hope Pond: (1) a single core sample analyzed in 5-cm segments for mercury (Table 4.5) and (2) a set of seven samples taken in May 1983 for the purposes of applying the Tennessee Extraction Procedure (EP)

est.
no
flow

1953
1954

Table 4.4. Estimated mercury lost to East Fork Poplar Creek

Year	Quarter			Yearly total	
	1	2	3		
1955	c/b 6000 0.62 /0.74	c/b 15,000 1.81/1.75/1.80 11.0	c/b 8000 1.26/1.06/1.13 11.6 >6/55 have flow	5,881 ^a 0.709 ^b 10.8 ✓	5,881 c/b 35,000 0.75 0.70 ✓
1956	3,192 0.359 0.31✓ 11.7 ✓	5,512 0.642 0.66✓ 11.3 ✓	13,711 1.654 1.53✓ 10.8 ✓	8,738 ✓ 0.956 1.26/1.02 11.9 ✓ 18.1 1st Q 1957 report	31,153
1957	15,954 1.609 1.54 13.2 ✓	19,497 2.422 2.4 10.6 ✓	21,993 3.015 3.1 9.5 ✓	14,970 1.805 1.8 10.8 ✓	72,413
1958	26,317 3.650 3.6 9.6 ✓	21,854 3.062 3.1 9.4 ✓	7,941 1.246 1.3 8.3 ✓	8,484 1.417 1.4 7.8 ✓	64,596
1959	6,246 0.990 1.0 3.4 ✓	5,440 0.738 0.7 9.7 ✓	5,329 0.738 0.6 9.4 ✓	1,589 0.197 0.2 10.5 ✓	18,604
1960	1,514 0.186 0.2 10.7 ✓	1,471 0.198 0.2 9.8 ✓	2,255 0.330 0.4 8.9 ✓	1,475 0.216 0.4 8.9 ✓	6,715
1961	949 0.133 0.1 9.5 ✓	841 0.103 0.1 10.3 ?	1,925 0.230 0.28 10.9 ✓	1,053 0.118 0.12 11.7 ✓	4,778
1962	2,032 0.205 0.11 13.2 ✓	857 0.064 0.11 13.4 ✓	200 0.021 0.16 12.4 ✓	1,790 0.210 0.17 11.1 ✓	4,875 c/b 6,800
1963	169 0.016 ? 14.1 ✓	441 0.040 14.7	249 0.032 10.2	162 0.025 8.5	1,020
1964	612 0.084 9.6	181 0.024 9.8	231 0.039 7.8	220 0.037 7.8	1,243
1965	338 0.050 9.0	1,454 0.231 8.3	369 0.050 9.6	299 0.050 7.8	2,460

NN = 12/56
= Y/HG-0437 (2 places)
decimal places

NN = Plant Quarterlys (2)

Q: Is the 12-10-82 letter from
Fee to Hickman
(Y-12) (O-Ro)
decimal places?

Table 4.4. (Continued)

Year	Quarter			<u>Estimated Revenue</u> <u>Yearly total</u>	
	1	2	3		
1966	357 0.050 9.5	354 0.040 11.8	227 0.028 10.7	214 0.030 9.3	1,152
1967	281 0.042 8.9	319 0.049 8.5	201 0.026 9.9	38 0.005 9.8	839
1968	34 0.005 9.7	41 0.005 10.6	32 0.004 10.3	29 0.004 9.7	137
1969	42 0.005 11.0	43 0.006 9.4	39 0.006 8.4	54 0.008 8.8	179
1970	41 0.006 9.2	182 0.033 7.2	296 0.043 8.9	167 0.021 10.2	685
1971	139 0.017 10.6	24 0.003 10.0	35 0.006 7.7	19 0.003 7.6	216
1972	8 0.001 10.3	4 0.0006 7.5	4 0.0007 6.9	6 0.0008 9.0	22
1973	126 0.020 8.6	154 0.019 9.8	1,049 0.161 8.2	3 0.0005 8.0	1,332 ^d
1974	189 0.035 8.1	56 0.017 5.2	2 0.0005 4.3	3 0.0005 6.9	249
1975	8 0.001 8.7	5 0.001 7.2	4 0.001 5.9	6 0.001 7.4	24
1976	7 0.001 8.6	6 0.001 7.6	6 0.001 8.4	7 0.001 8.7	25

1975 + 0.006
1976 + 0.006

Table 4.4. (Continued)

Year	Quarter				Estimated losses Yearly total
	1	2	3	4	
1977	5 0.001 8.0	9 0.001 9.5	13 0.002 8.5	23 0.003 9.1	51
1978	17 0.002 9.8	7 0.001 7.5	7 0.001 6.9	6 0.001 6.9	38
1979	12 0.002 8.1	8 0.001 7.5	10 0.002 7.9	11 0.002 7.3	41
1980	17 0.002 9.7	13 0.002 8.4	9 0.001 7.5	12 0.002 8.4	51
1981	13 0.002 7.5	9 0.002 7.6	7 0.001 6.9	5 0.001 6.6	34
1982	33 0.005 9.2	7 0.001 8.0	13 0.002 9.1		53
	TOTAL LOSS				218,869

a Mercury lost (lb).

b Average mercury concentration (mg/L).

c Average stream flow rate (Mgd).

d For August 1973, one mercury concentration value was reported as <1.0 mg/L. It was not possible to verify that this was a valid value. It is the cause of the large loss for third quarter 1973.

235,000

253,869

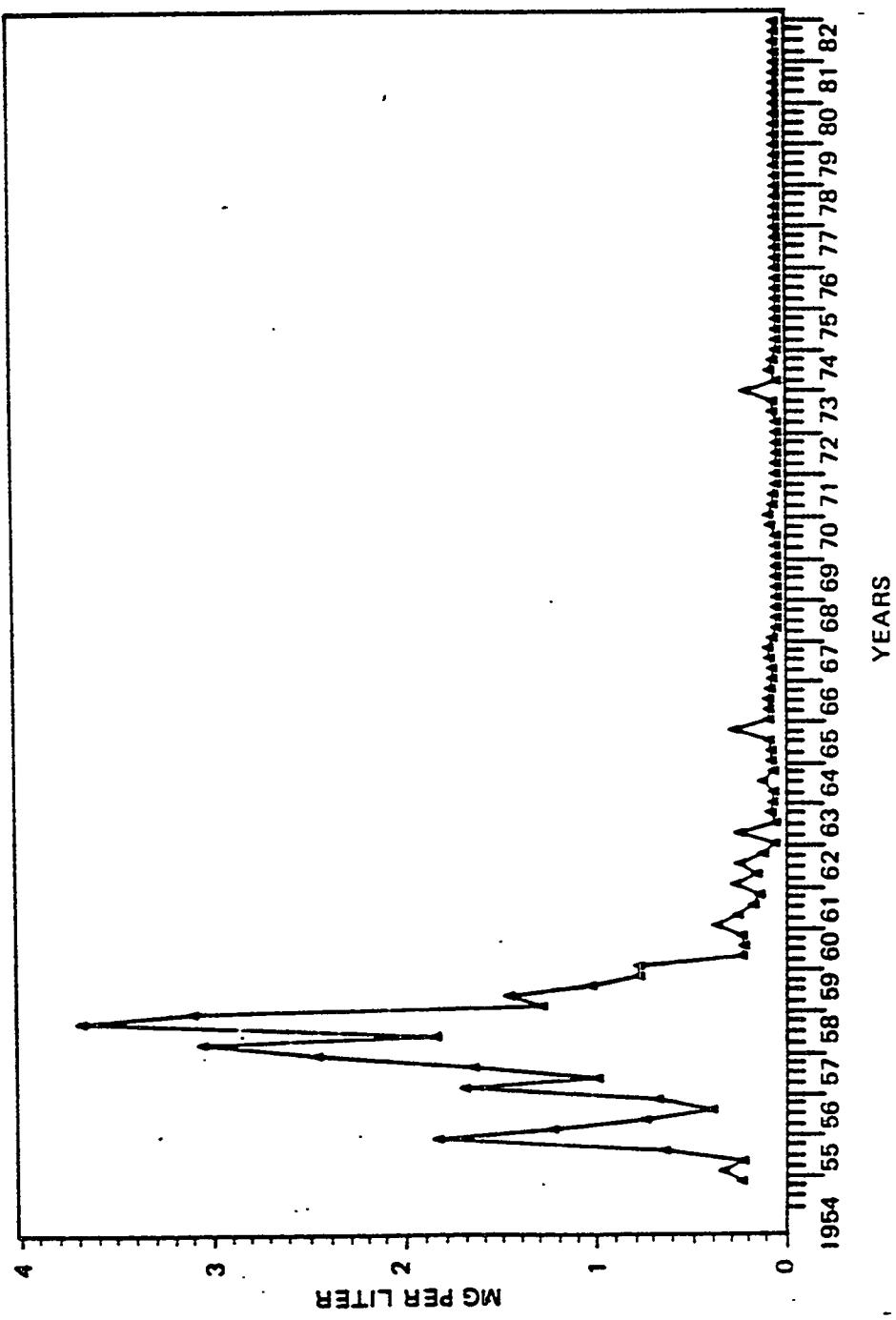


Fig. 4.2. Mercury concentrations for East Fork Poplar Creek.

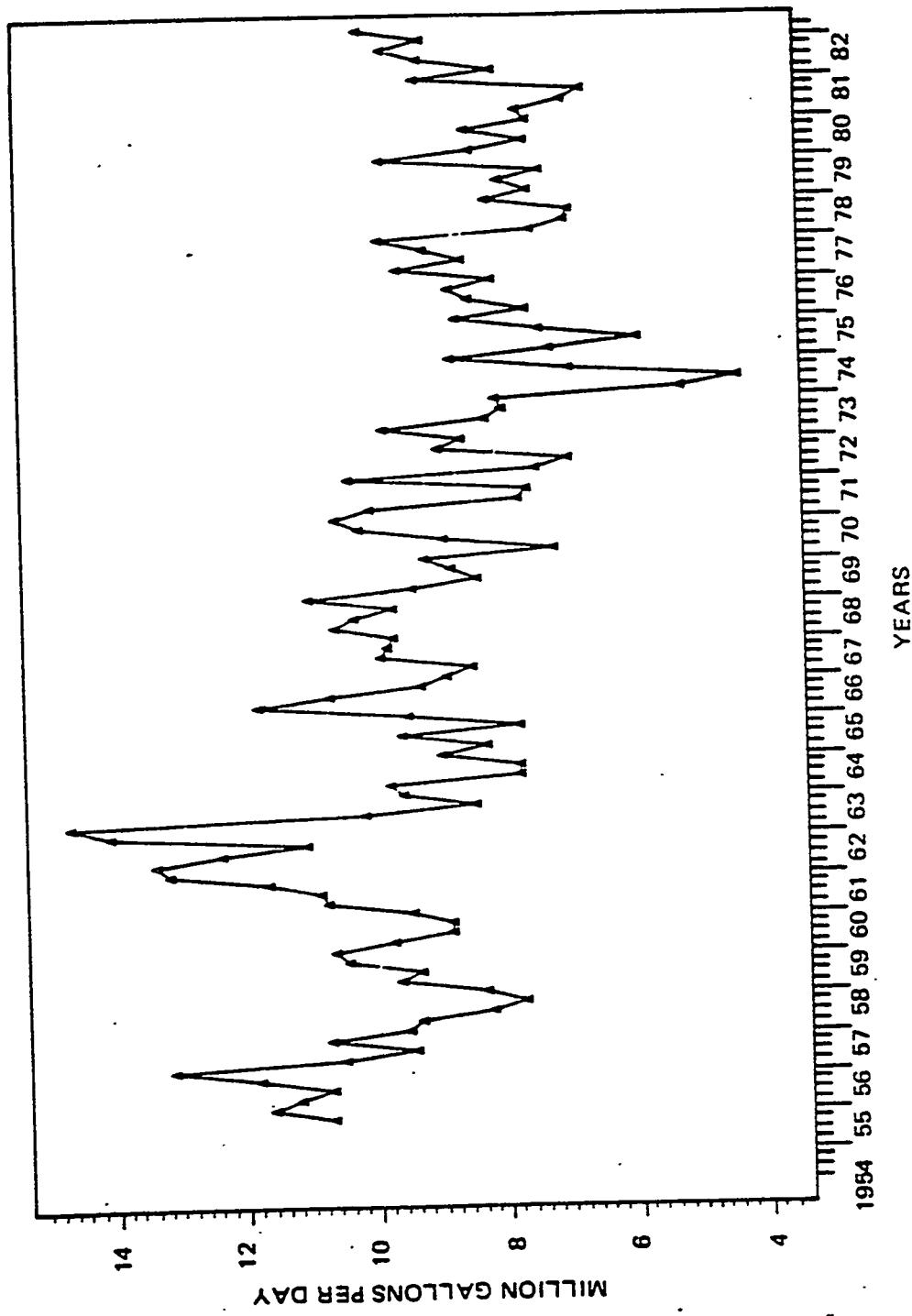


Fig. 4.3. Stream flow rates for East Fork Poplar Creek.

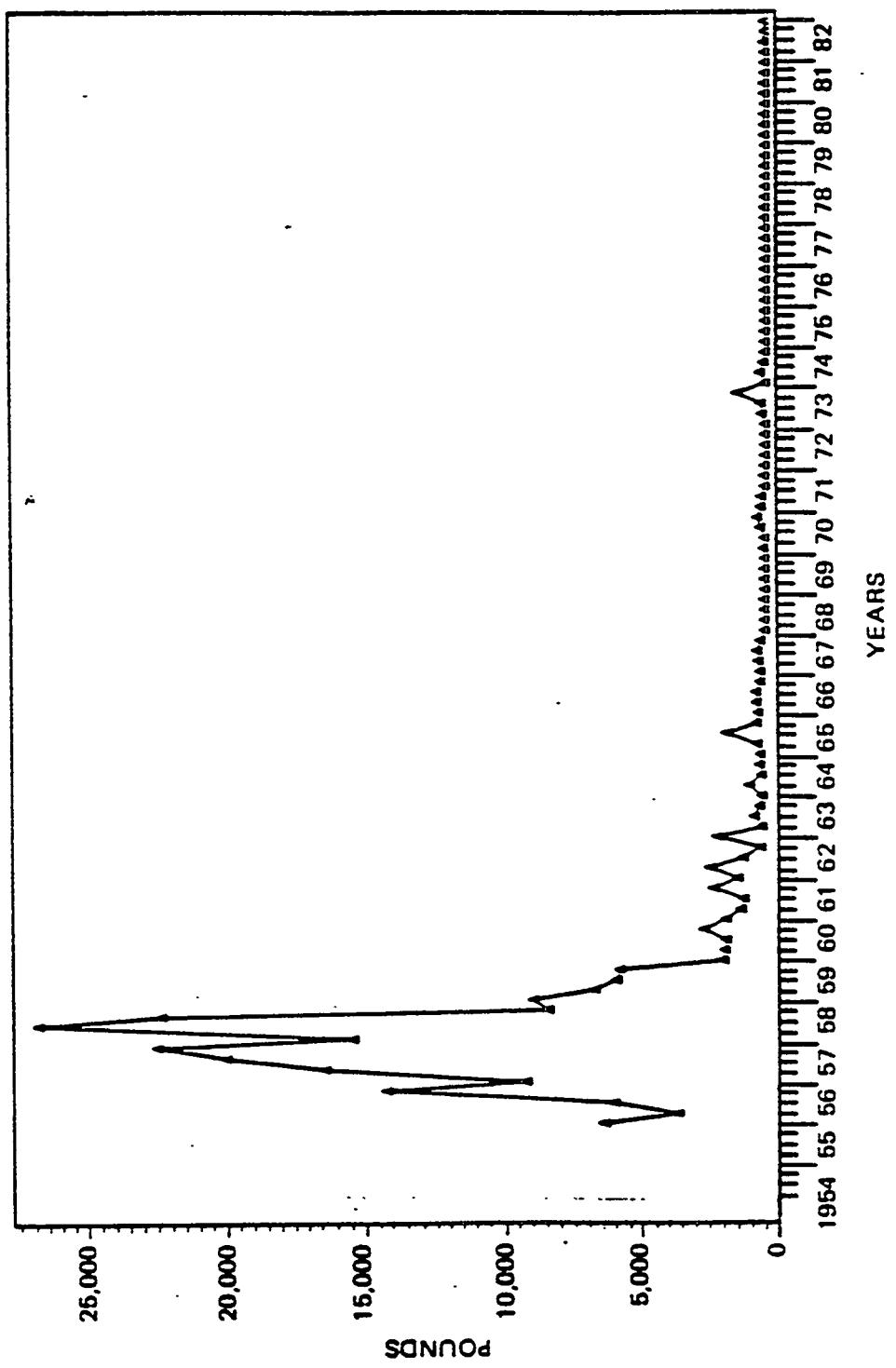


Fig. 4.4. Mercury losses to East Fork Poplar Creek.

Table 4.5. Total mercury concentration of New Hope Pond sediment layers. Core collected May 5, 1982, from central area of pond

Sample code	Interval (cm)	Percent moisture ^a	Total Hg (μg/g dry wt.)
NHP-1	0-5	80	107
NHP-2	5-10	68	108
NHP-3	10-15	64	116
NHP-4	15-20	70	110
NHP-5	20-25	68	122
NHP-6	25-30	61	174
NHP-7	30-35	54	240
NHP-8	35-40	59	220
NHP-9	40-45	47	278
NHP-10	45-50	52	170,166 ^b
NHP-11	50-55	46	159
-	55-60	45	c
NHP-13	60-65	43	220
-	65-70	43	c
NHP-14	70-75	54	302
-	75-80	48	c
NHP-15	80-85	47	292
-	85-90	30	c
-	90-95	27	c

^a(Wet weight - dry weight)/wet weight.

^bResults of duplicate analyses.

^cSample not analyzed.

1973 dredging

Toxicity Test to the sediment to determine whether it is classified as a hazardous waste (reference Sect. 6.7).

The dredging contractor was paid for removal of 19,000 yd³ of sediment in the 1973 dredging operation. It is estimated that the buildup in sediment presently in New Hope Pond is approximately the same as it was in 1973. The 1973 dredging represented ten years of sediment buildup. The sediment presently in New Hope Pond represents ten years of buildup.

The density of the sediment was estimated by T. R. Butz to be 100 lb/ft³. This density estimate was combined with the estimate of the volume of material removed from New Hope Pond to estimate the pounds of sediment now in New Hope Pond.

$$(19,000 \text{ yd}^3)(27 \text{ ft}^3/\text{yd}^3)(100 \text{ lb}/\text{ft}^3) = 51.3 \times 10^6 \text{ lb sediment}$$

No data are available to estimate the variance associated with the amount of sediment removed from New Hope Pond.

The average of the following mercury concentration data (ug/g Hg) was then multiplied by the number of pounds of sediment to obtain the number of pounds of mercury estimated to be in New Hope Pond.

Sediment samples (ug/g Hg)
(Data Sets 1 and 2)

57	122
110	174
160	240
150	220
120	278
160	170
94	166
107	159
108	220
116	302
110	292

$$\bar{x} = \text{Sample average} = 165.2 \text{ ppm}$$

$$s = \text{Sample standard deviation} = 67.4 \text{ ppm}$$

$$(51.3 \times 10^6 \text{ lb sediment}) \left(\frac{165.2 \text{ lb Hg}}{10^6 \text{ lb sediment}} \right) = 8,475 \text{ lb Hg} .$$

The variance associated with the number 8,475 cannot be estimated well because of the lack of an estimate of the variance of the amount of sediment. However, if the amount of sediment is treated as a constant, rather than as the realization of a random variable, then the standard deviation associated with the number 8,475 can be approximated by the product:

$$(51.3 \times 10^6)(67.4 \times 10^{-6}) = (3457.62) .$$

This result then leads to the following approximate 95% confidence interval:

$$8,475 \pm 6915.2 .$$

4.3.2.2 Chestnut Ridge Holding Area, Original Dredging

The dredging contractor was paid for the removal of 19,000 yd³ of sediment in 1973. This sediment was placed in a spoils pit on Chestnut Ridge.

Prior to dredging (October 31, 1971), ten core samples were taken from sediment in New Hope Pond. The raw data cannot now be located, but the range and average (J. Underwood and M. Sanders) are as follows:

10 Samples taken

Average - 125 ppm Hg

Maximum - 640 ppm Hg

Minimum - 29 ppm Hg

Estimating parameters

19,000 yd³ removed

100 lb/ft³

125 ppm Hg (based on October 31, 1971, data from J. Underwood)

Estimate

$$(19,000 \text{ yd}^3)(27 \text{ ft}^3/\text{yd}^3)(100 \text{ lb/ft}^3) = 51.3 \times 10^6 \text{ lb sediment ,}$$

$$(51.3 \times 10^6 \text{ lb})(125 \text{ lb Hg}/10^6 \text{ lb}) = 6,464 \text{ lb Hg}$$

4.3.2.3 Chestnut Ridge Holding Area, Subsequent Sediment Removal Since 1974

Since 1974, the Maintenance Division has routinely removed accumulated sediment from the dispersion ditch south of New Hope Pond, the industrial ditch upstream of the dam, and the oil skimmer. In 1980, a segment of sediment was removed from New Hope Pond around the aerator. These materials have been placed in one area of the spoils pit on Chestnut Ridge.

Estimates of the quantity of material removed came from J. K. Bailey, Maintenance Division.

Core samples were taken in May 1983 for the Tennessee Extraction Procedure Toxicity Test of the sediment in the area where the recent spoils were placed and are believed to be representative of the mercury concentration of sediments removed since 1974 and are shown in Table 4.6.

Table 4.6. Mercury concentration in recent dredgings in Chestnut Ridge Holding Area

Sample requisition number	Sediment ($\mu\text{g/g Hg}$)
119104	110
105	130
106	110
107	140

Estimating methodology

Quantity removed = 500 yd^3 (J. K. Bailey)

Density = 100 lb/ft^3 (T. R. Butz)

Sample data ($\mu\text{g/g Hg}$)

110
130 $\bar{x} = 122.5$
110 $s = 15$
140

$$(500 \text{ yd}^3)(27 \text{ ft}^3/\text{yd}^3)(100 \text{ lb}/\text{ft}^3) = 1.35 \times 10^6 \text{ lb sediment ,}$$

$$(1.35 \times 10^6 \text{ lb})(122.5 \text{ lb Hg}/10^6 \text{ lb}) = 165 \text{ lb Hg .}$$

The variance associated with the number 165 cannot be estimated well because of the lack of information about the variability associated with the number 1.35×10^6 . However, if 1.35×10^6 is treated as a constant, rather than as the realization of a random variable, then the standard deviation associated with the number 165 can be approximated by the product:

$$(1.35 \times 10^6)(15/10^6) = (20.25) .$$

This result then leads to the following approximate 95% confidence interval:

$$165 \pm 40.5 .$$

4.3.3 Final Estimate of Sediment Loss

	Quantity mercury (lb)
- Presently in New Hope Pond	<u>8,475 ± 6,915</u>
- 1973 dredged material presently in Chestnut Ridge Holding Area	6,464
- Sediments removed since 1973 presently in Chestnut Ridge Holding Area	<u>162 ± 41</u>
TOTAL - New Hope Pond sediments, 1963 to 1983	15,104

Note: The 1973 dredging did not remove all sediment from New Hope Pond. The lower part of the core on Table 4.5 is suspected to contain some of the original material deposited since 1963.

4.4 ACCIDENTAL LOSS QUANTITIES

4.4.1 Loss Mechanisms

4.4.1.1 Spills

Spills, as reported in this document, refer to losses of mercury from the process equipment when that mercury did leave or had a potential for leaving the building containment system and entered the ground.

4.4.1.2 Cascade Upsets

Cascade upset was a generic term used to describe any interruption of countercurrent flows in any given cascade or in any column of a cascade. The interruption could have been caused by decreased liquid flow or a decreased lithium concentration in either phase or a combination of both. In some cases, but not all, this could have resulted in mercury or amalgam or aqueous containing small amounts of amalgam being spilled from the equipment into the containment system.

An amalgam-making tray being taken off-stream for cleaning or bonnet (anode) replacement necessitated a flow reduction. The spill resulting from this would have been minimal when the tray was opened and the bonnet or bonnets were removed to the chemical area, but there would have been some mercury that adhered to the anodes. The transfer was made in special dollies with drip pans attached. However, there was generally some mercury dropped in the transfer from the tray to the dolly and from the dolly to the cleaning station.

In the event of a column flooding (usually a major upset) some amalgam would get into the amalgam overflow header. This system contained many flanges and had the usual predictable leaks; however, the upset was usually 100% contained. In the event of pump failure [redacted] there was always a small spill associated with equipment replacement. Major unscheduled shutdowns (usually electrical in nature) generally resulted in some overflow of aqueous material but not usually mercury spillage.

Catastrophic failure occurred on rare occasions such as a pump being inadvertently deadheaded or a ruptured pipe line, which could lead to a major spill (100-gal range) of mercury or amalgam. These were in the containment section of the building and represented more of a personnel hazard than a loss of mercury.

4.4.1.3 Leaks

In the normal operation of the facilities, minor leakage occurred continuously, as described below.

Leaking flanges

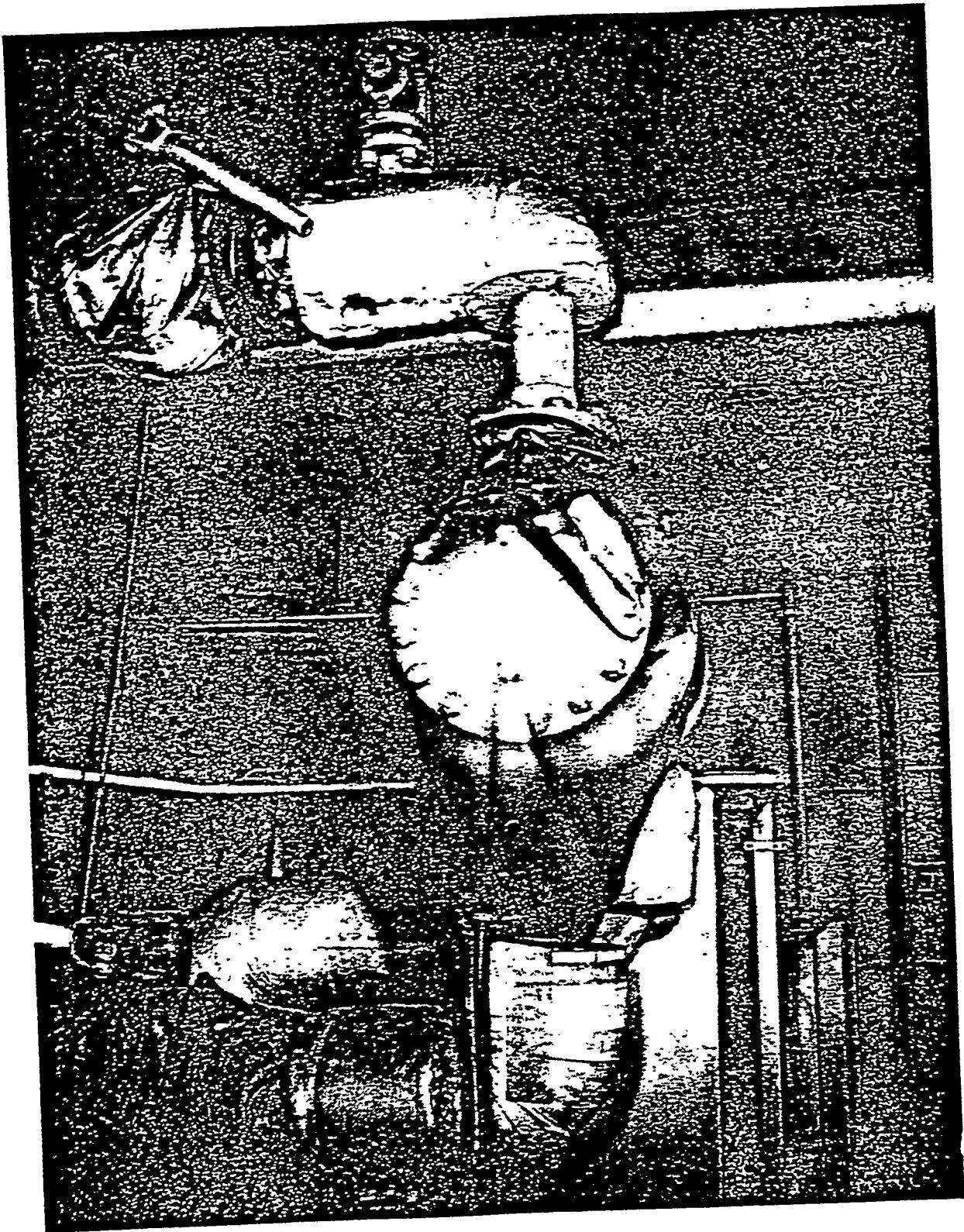
Mercury and/or amalgam was difficult to contain in a piping system because of the high pressure required to pump it. The mercury and amalgam systems were composed of welded pipes and, where possible, flanged pipes. The systems were heavily instrumented, which required many penetrations into the process piping and equipment. Most of these leaked at one time or another. These leaks were occasional drips; they were not a continuous flow.

If these leaks could not be stopped by maintenance that involved tightening the bolts on the flange, they were wrapped with a plastic shroud (Fig. 4.5). A drain tube was attached to the plastic shroud, and this was terminated into a container to collect the leak or to a process floor drain if one were nearby.

A shutdown log was maintained by the process engineer. The foremen and process engineers entered data in this log on leaks that could not be stopped. Every four to six months one or more of the cascades would be shut down for major maintenance and/or process improvements. These shutdowns were scheduled well in advance, and each maintenance crew had a preassigned list of activities. Those leaks that had been identified prior to the shutdown were included in the preplanned work schedule.

Equipment replacement

Most of the process equipment could be replaced by isolation and replacement. This included mercury pumps, amalgam pumps, aqueous pumps, [redacted] and some instrumentation. The equipment was first isolated by closing block valves on either side of the item being replaced and, if possible, draining the equipment before any flanges were unbottled. Process operators always worked with the maintenance craftsmen to drain the equipment and collect any mercury. Normally the



Set a shroud over leak no 2 angs

mercury was vacuumed up or poured into the process drain system. When the equipment was disconnected, process operators cleaned up any spills of mercury that may have occurred and vacuumed any mercury that remained in the equipment. The open ends of the pump were then covered with plastic "shower caps" to prevent any spillage of mercury during the transfer of equipment and to minimize any mercury vapor release to the work area.

Operation difficulties

There were times when different types of equipment would fail or partially plug up as a result of solids buildup in the pipe lines or in the equipment itself. This could result in an overflow of that equipment. A failure of this type occurred on November 15, 1956, in 9201-5 when the decomposer in Cascade [redacted] overflowed. Considerable cleanup effort was involved and covers were provided then for adjacent equipment to facilitate future cleanup operations. This spill is discussed further below (see Sect. 4.4.2.2, "Spill 4").

Design

Because of the equipment involved, a potential for seepage or leaks existed wherever there was a rotating seal. This occurred on all pumps [redacted]. These leaks were collected in funnels and diverted to the process drain system. As in the case of the aforementioned leaking flanges, this was an occasional drip and not a continuous flow.

Human error

The Colex process was very complex and consisted of many valves and control mechanisms. Operational and procedural errors occasionally occurred that resulted in the release of mercury or amalgam. These releases were recovered by vacuuming and by sweeping the mercury and amalgam to the process drain system.

Minor upsets in the process occurred on a daily basis. During early 1956, [redacted] cascades suffered about [redacted] small upsets and [redacted] major appreciable upsets each day in addition to the types of upsets that accompany a cascade shutdown. Unscheduled cascade shutdowns in both Colex production plants occurred [redacted] times during each quarter of operation in the late 1950s. This was slightly reduced in the early 1960s.

4.4.2 Methodology of Estimate

Spills are discussed for pilot plants and each process building in the following sections. Estimates are based on limited available data and interviews with Y-12 personnel who were in the operation at that time.

4.4.2.1 Building 9201-2 (1951-1955)

This building housed several pilot plants and equipment over the four-year period of operation. During this period, the building inventory was 321,753 lb (Ref. 6), of which a total of 186,596 lb (Ref. 6) was transferred to other facilities when the test facilities were closed. The balance of 135,157 lb was unaccounted for. Subsequent to closing the facilities, small amounts of mercury were recovered. One example was 800 lb recovered when an unused pipe was removed on June 7, 1983.

Mercury is also known to still be in the building structure. When the first floor was converted to office space and the blocks and walls were removed, mercury seeped out from the walls; very small beads of mercury are still visible in the basement area today.

There were three events in which mercury was spilled and seeped through the floor into the dirt basement. Extensive efforts were made to recover the mercury, and the dirt was removed for processing in Building 81-10. The end of the building was opened and small digging equipment was used to remove the dirt. Not much mercury was recovered since the mercury ran deeper into the ground during excavation operation. A heavy layer of sulfur was then added on top of the dirt to contain any mercury vapor. Descriptions of the three spills follow.

Event 1

A check valve in a Colex column pipe test ruptured during a pump test. This released all of the mercury in the column above the check valve. Mercury was sprayed throughout the area and seeped into the basement.

Event 2

The seam in a pipe split during a Colex test. Mercury was sprayed under high pressure throughout the area and seeped into the basement.

Event 3

A pump failed during a combined test of Elex and Component Test Facility [REDACTED] for Colex. Mercury was sprayed over the area and seeped into the basement.

4.4.2.2 Colex Process Building Spills

Colex process building spills are described below, and quantities involved are summarized on Table 4.7. Locations are depicted in Figure 4.6.

Spill 1

A Dressler coupling, which is an expansion joint [REDACTED] broke on Cascade [REDACTED] on January 1, 1956. [REDACTED] elapsed before the cascade was shut down. Amalgam under

Table 4.7. Summary of accidental losses to the ground

Location	Date	Estimated quantity spilled (lb)	Estimated losses (lb)
#1 9201-2	1951-1955 (3 spills)	100,000-120,000	#1 ~95,000 US: 108,000 (Stoner 1983)
X 9202	1953-55		Visible mercury shoveled. Dirt sent to Building 81-10.① Unable to recover much mercury in ground at spill
#2 9201-5	01/01/56	113,000-170,000	#2 ~70,000 #1b 50,000 (Stoner 1983) Visible mercury recovered, some lost to ground through floor
#3 Ramp area north of 9201-5	07/17/56	22,500-90,000	#5 → ~40,000 Visible mercury shoveled; dirt sent to Building 81-10,① unable to recover much mercury in ground at spill
#4 Between 9204-4 and 9201-5	mid-1956	22,500-90,000	Visible mercury shoveled; dirt sent to Building 81-10,① unable to recover much mercury in ground at spill
#5 9201-5	11/15/56	22,500-45,000	#3 → ~85,000 Visible mercury recovered, some lost to ground through floor
X 9201-5	1-15 1965		#4 → ~85,000 #5b material not Hg (Y/HG-0203 and ORD-125208)
#6 9201-5	03/28/66	✓ 105,000	#6 49,853-lb measured loss to ground; dirt sent to Building 81-10,① unable to recover much mercury in ground at spill
TOTAL		380,500-515,000	~424,853

⁴Dirt from spills not segregated from other materials processed through Building 81-10; therefore, no data on amount recovered are available.

Estimates are based on mercury losses through seams in floors, cracks in floors, and unrecoverable mercury in the ground. Mercury would continue to go deeper into the ground during recovery operations with backhoes and shovels.

$$\begin{array}{r}
 424,853 \\
 - 49,853 \\
 \hline
 375,000
 \end{array}$$

Y-DNA G3-787RA2

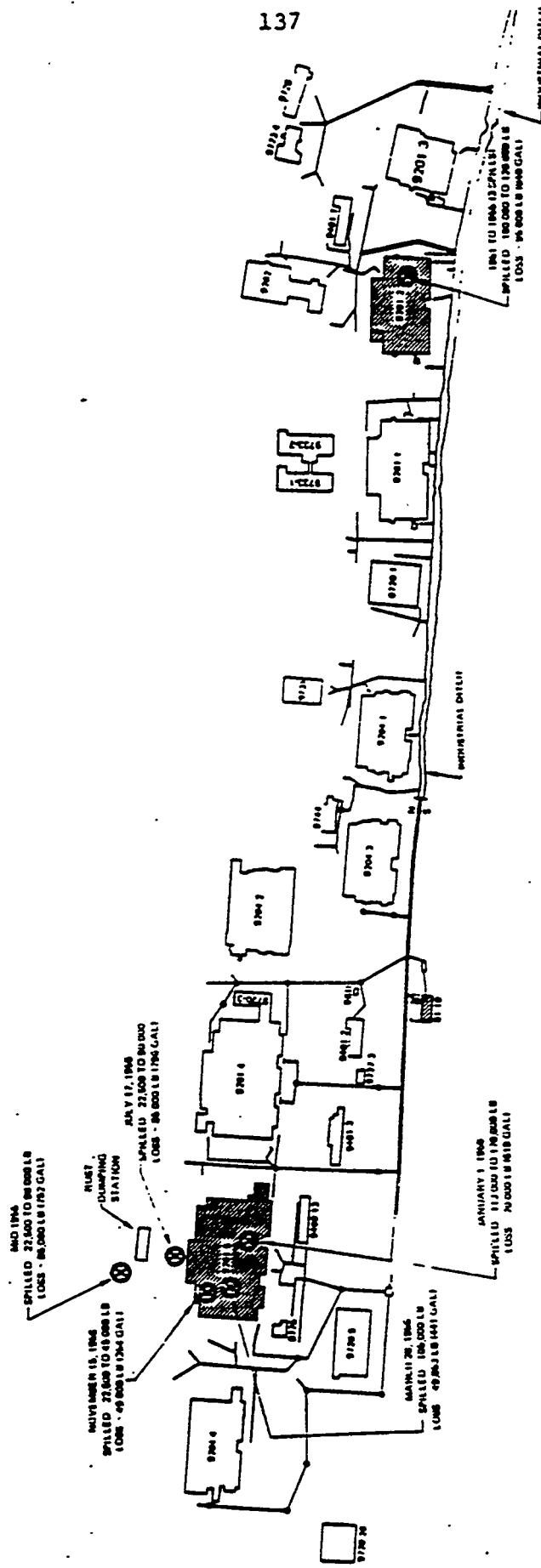


Fig. 4.6. Location of accidental mercury losses to the ground.

112.5 lb/gal.

pressure was sprayed throughout the area and on the motor generator sets that supplied power to Cascades [] and []. An estimated 1,000 to 1,500 gal (113,000-170,000 lb) were spilled in the area. All visible mercury was recovered inside the building; however, some mercury was released to the ground through the fan room floor.

Spill 2

An operator error in valving occurred while transferring mercury from Building 9201-5 to Building 9201-4 on July 17, 1956. An estimated 200 to 800 gal (22,500-90,000 lb) of mercury were spilled. Visible mercury was recovered by shoveling, and dirt was recovered using a backhoe for processing through Building 81-10.

Spill 3

An operator error in valving occurred during transfer of mercury from Building 9204-4 and 9201-5 in mid-1956. Mercury was dumped on the ground at the mercury dumping station. An estimated 200 to 800 gal (22,500-90,000 lb) of mercury were spilled. Visible mercury was recovered by shoveling, and dirt was removed using a backhoe for processing through Building 81-10.

Spill 4

Cascade [] Column [] plugged in November 15, 1956. This caused the mercury and amalgam to over flow on the northwest corner of the building. The overflow continued until the cascade was shut down in []. An estimated 200 to 400 gal (22,500-45,000 lb) of amalgam and mercury were spilled. Visible mercury was shoveled off the ground and backhoes were used to salvage dirt that was later processed through Building 81-10.

Spill 5

A leak occurred in a sight glass in the two-tank mercury collection system on March 28, 1966, in Building 9201-5. Approximately 920 gal (105,000 lb) of mercury spilled on the dump pit floor. Approximately 55,000 lb of mercury were recovered and the remainder of the mercury seeped through construction expansion joints into the earth fill under the concrete slab. It was determined by measurement that 49,853 lb of mercury were lost in the spill. This spill was investigated in detail by an Atomic Energy Commission (AEC)/Y-12 investigating team (Ref. 7) (see Fig. 4.6).

Uncertainty statement for March 1966 spill

This spill was the only quantified loss by any measurement. The following addresses uncertainties associated with the measurement.

O.K.
YHG-151

1. The two tanks contained a nominal 1,500 gal each and were calibrated so that the level of mercury could be determined by reading a sight glass and plastic tube arrangement. The accuracy of this calibration is not known.
2. The ability of the operator to read the sight glass is not known, but was estimated by two different people independently as ± 0.25 in. or ± 495 lb.
3. The major source of uncertainty is the amount of the March collections, which were estimated to be 5,000 lb. A good explanation of how this estimate was determined could not be found. Amounts collected during the previous nine months (June 1965 to March 1966) were estimated to be 7,740, 8,654, 5,944, 7,926, 7,926, 3,963, 9,908, 10,898, and 21,787 lb, respectively, indicating that the 5,000-lb estimate may be biased low.

It should be noted that none of these estimated inventories were obtained by direct measurement, but rather by difference. That is, the amount added during a given month was estimated to be the difference between the beginning inventory of the current month and the beginning inventory of the previous month. The 5,000 lb estimated to have been added during the month of the spill could not have been obtained in a similar manner because no inventory was taken just prior to the spill. Unfortunately, no documentation could be found to explain the 5,000-lb estimate.

We know that a lower physical bound on the March collection is zero (i.e., that none was added to the tanks). An upper physical bound can be obtained by observing that the open end of the plastic tube was tied off approximately three-fourths of the way up the tank (see the Fig. 4.7). This means that the tanks could not have been over three-fourths full when the spill occurred. Since the tanks together could hold 339,000 lb (3,000 gal), the maximum amount that could have been in the tanks at the time of the spill is 254,000 lb ($0.75 \times 339,000$). Thus the maximum amount that could have been physically collected during March before the spill is $254,000 - 145,608 = 108,392$. This leads to an upper physical bound on the amount lost of 153,245 lb.

Thus the interval that almost certainly covers the amount lost has a lower bound of 44,853 lb and an upper bound of 153,245 lb.

4.4.2.3 Building 9202

The Orex (organic exchange) process pilot plant was located in this building. The process operated from April 1953 through May 1954. There were no reported events or spills associated with this process; however, an estimated 50,000 lb of mercury were lost. The mercury had not been recovered in the building trap and the trap and storm sewer was excavated in an effort to recover the mercury. The dirt was later processed at Building 81-10.

Y/PH-214002

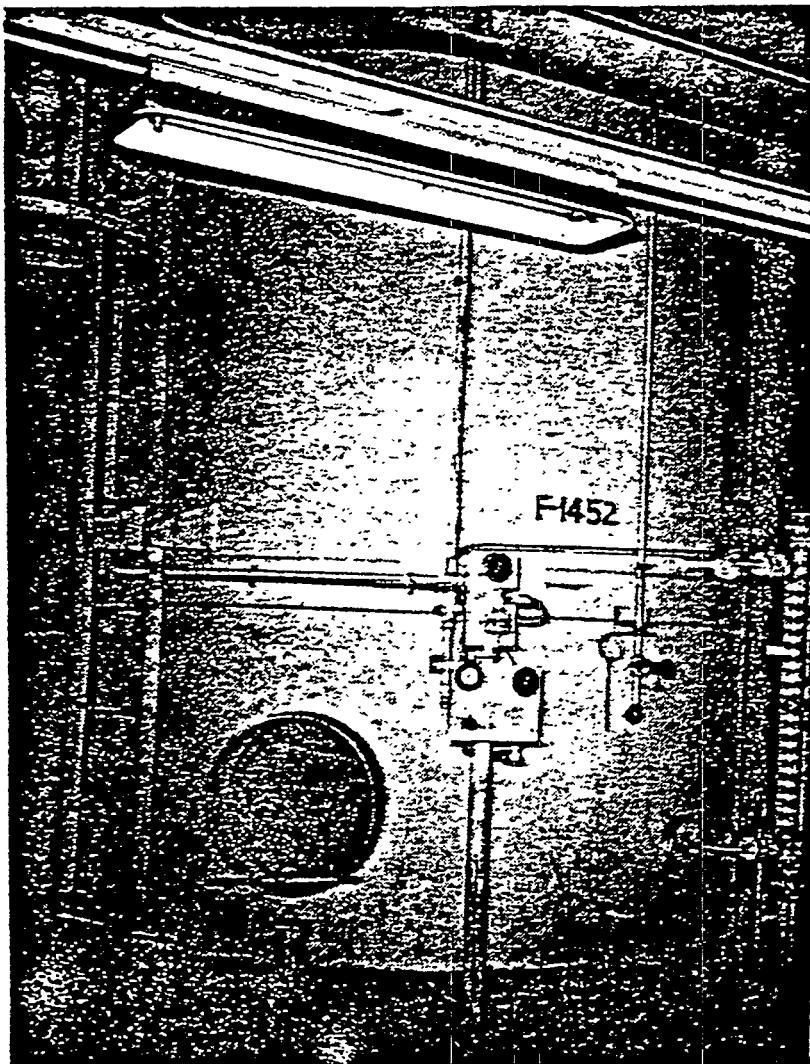


Fig. 4.7 Mercury collection tank in Building 9201-4.
1983 photo

4.4.2.4 Building 9733-1

The Orex development facility operated in this building in 1951 and 1952. No major losses were reported, and small losses from leaks and other events did occur. Mercury that leaked was collected in a trap installed in the floor drain system. This trap was routinely checked and emptied.

4.4.2.5 Building 9733-2

The Elex (electrical exchange) development facility operated in this building in 1950 and 1951. This was a bench scale facility, with small equipment installed on the top of a 15- to 20-ft long laboratory bench. No major losses were reported, and small losses from leaks and other events were collected in a trap installed in the floor drain system. This trap was routinely checked and emptied.

4.4.2.6 Building 81-10

The Building 81-10 facility was composed of a storage shed approximately 40 × 100 ft and a processing area approximately 30 × 50 ft. The storage section was a concrete pad with no curbing. The process area was a curbed concrete pad and had a collection system that collected material from the drain on the pad.

Some mercury did leak or was spilled from containers on the storage pad and did get dispersed into the adjoining strip of ground.

In August 1971 (Ref. 8), there were some core drillings made to determine the extent of mercury in the ground around the facility. If one assumes contamination to be in a band of earth extending five yards out from the concrete and to a depth of five yards around the entire facility, this would be ~3,000 cubic yards at 3,000 lb/yard or roughly 10,000,000 lb of earth. The average analysis reported was 0.03%. This would be ~3,000 lb of mercury.

4.4.3 Final Estimate of Accidental Loss

The estimates of losses are based on professional judgment and, with the exception of the March 1966 spill, are not measured losses at the time that spills occurred. The total quantity of mercury involved in the spills may be significantly different from these estimates. As previously indicated, the amount of mercury recovered from dirt processed through Building 81-10 was not measured.

Total estimate of losses to the ground (lb)

Spills	424,853
Building 81-10	<u>3,000</u>
TOTAL	427,853

4.5 FLASK LOSS QUANTITIES

4.5.1 Loss Mechanism

Mercury flasks were stored in Salvage Yard 200 following emptying for the lithium isotope separation process. The flasks were exposed to the weather for approximately ten years and required extensive cleaning, sorting, and painting. The flasks were moved by dump truck to the Building 9201-5 wash station. Flasks were sorted for size and condition. All flasks that were not usable were discarded, and selected flasks were inverted to drain residual mercury. Flasks selected for reuse were sent to the Oak Ridge Gaseous Diffusion Plant (ORGDP) for pickling. Discarded flasks were sold as scrap.

4.5.2 Final Estimate of Flask Loss

Approximately [REDACTED] flasks were received at the Y-12 Plant. Of these, 13,750 flasks of mercury was returned to the General Services Administration (GSA) (9,682 had not been opened). [REDACTED]

The balance of [REDACTED] flasks was sold as scrap. Some small amount of mercury clings to the inside of even well-drained flasks and represents an additional "loss" from the system. An Environmental Protection Agency (EPA) report in 1975 estimated that the average "empty" flask contained 45.4 g of mercury (Ref. 9). Hence:

[REDACTED]

4.6 OTHER MERCURY UNACCOUNTED FOR

4.6.1 Estimate of Quantity of Mercury Lost to Buildings 9201-4 and 9201-5 Drain System but Probably Remaining Within the Y-12 Plant

Loss mechanism

Mercury was lost to the storm sewer system from the Colex operations in Buildings 9201-4 and 9201-5 both in the soluble and insoluble phase. The soluble phase loss was discussed in Section 4.2.1. Insoluble mercury in suspension form was lost through the floor drain collection and decant systems. Metallic and other insoluble mercury also came from sumps from the fan rooms of the buildings. Mercury entered the fan rooms through various mechanisms such as floor cracks, leaky pipes, condensation, and leaks within the hollow walls, etc. The fan room sumps discharged into the storm sewer system.

If the metallic mercury is drawn into a pump, it will likely be dispersed into fine globules that are more easily carried by flowing water. Consequently, metallic mercury was probably carried into the storm sewer system through sump pumps in each building.

~~SECRET~~

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4.5 FLASK LOSS QUANTITIES

4.5.1 Loss Mechanism

Mercury flasks were stored in Salvage Yard 200 following emptying for the lithium isotope separation process. The flasks were exposed to the weather for approximately ten years and required extensive cleaning, sorting, and painting. The flasks were moved by dump truck to the Building 9201-5 wash station. Flasks were sorted for size and condition. All flasks that were not usable were discarded, and selected flasks were inverted to drain residual mercury. ~~Flasks selected for reuse were sent to the Oak Ridge Gaseous Diffusion Plant (ORGDP) for pickling.~~ Discarded flasks were sold as scrap.

4.5.2 Final Estimate of Flask Loss

Approximately 320,000 flasks were received at the Y-12 Plant. Of these, 13,750 flasks of mercury was returned to the General Services Administration (GSA) ~~49,682 had not been opened~~. Others were sold to the public sector, and 1,288 flasks were pickled at ORGDP and reused. The balance of 200,000 flasks was sold as scrap. Some small amount of mercury clings to the inside of even well-drained flasks and represents an additional "loss" from the system. An Environmental Protection Agency (EPA) report in 1975 estimated that the average "empty" flask contained 45.4 g of mercury (Ref. 9). Hence:

$$200,000 \text{ flasks} \times 45.4 \text{ g/flask} = 20,017 \text{ lb mercury}$$

4.6 OTHER MERCURY UNACCOUNTED FOR

4.6.1 Estimate of Quantity of Mercury Lost to Buildings 9201-4 and 9201-5 Drain System but Probably Remaining Within the Y-12 Plant

Loss mechanism

Mercury was lost to the storm sewer system from the Colex operations in Buildings 9201-4 and 9201-5 both in the soluble and insoluble phase. The soluble phase loss was discussed in Section 4.2.1. Insoluble mercury in suspension form was lost through the floor drain collection and decant systems. Metallic and other insoluble mercury also came from sumps from the fan rooms of the buildings. Mercury entered the fan rooms through various mechanisms such as floor cracks, leaky pipes, condensation, and leaks within the hollow walls, etc. The fan room sumps discharged into the storm sewer system.

If the metallic mercury is drawn into a pump, it will likely be dispersed into fine globules that are more easily carried by flowing water. Consequently, metallic mercury was probably carried into the storm sewer system through sump pumps in each building.

~~SECRET~~

The storm sewer system from Buildings 9201-4 and 9201-5 is composed primarily of concrete pipe with some cast iron and clay tile pipes. Pipes feed into a network of junction boxes ultimately into the industrial ditch. The storm sewer was installed when the plant was built and there is visible evidence of deterioration in certain pipes. It can be reasonably expected that not all joints in all pipes are still tight.

Mercury pockets have been observed in bell joints of pipes and in junction boxes. Debris and sediment have been observed in many pipes and junction boxes. Since mercury has an affinity for finely divided organic particulate matter, and current mercury losses are in the filterable solid phase, these sediments are expected to be contaminated with mercury.

It is estimated that 5,000 to 10,000 lb of mercury remains within the Y-12 Plant in the storm sewer system and in the ground around storm sewer piping and junction boxes. The distribution of this mercury between the sewer system and the ground is uncertain.

4.6.2 Mercury Still in Building Structure

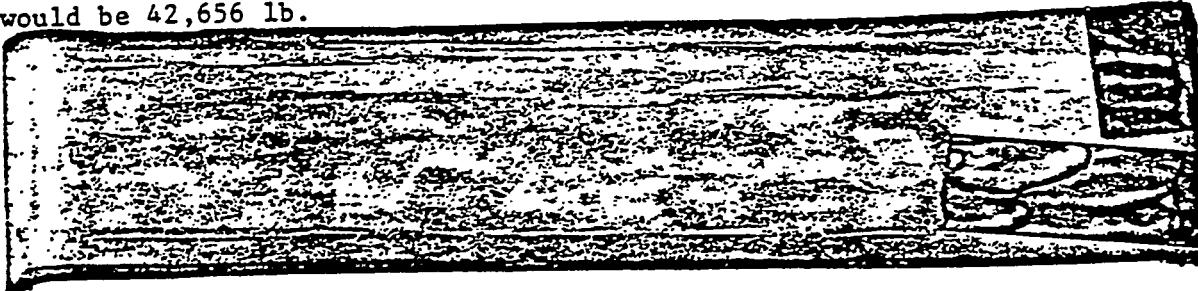
In October 1975, the EPA published a study (Ref. 9) of the chlor-alkali manufacturing sector. These plants (28 in the U.S. in 1975) are among the largest users of mercury--in 1973 consuming 992,000 lb or 24% of the U.S. consumption. The EPA report deals with the mercury material balance in these plants and the losses that are encountered to the environment, etc. The material balance was calculated for a 500-ton-chlorine-per-day plant using 1973 technology with a mercury efficiency of 0.4 lb/ton chlorine. Figure 4.8, based on information from this report, is a material balance for a 500-ton-per-day chlor-alkali plant using 1973 technology. Typical annual plant losses are:

<u>Losses</u>	<u>Quantity (kg)</u>	<u>% Total</u>
Air	827	2.6
Water	276	0.9
Land	19,192	60.4
Product	637	2.0
Theft	184	0.6
Subtotal	21,116	(66.5)
System buildup (added to inventory)	10,099	31.8

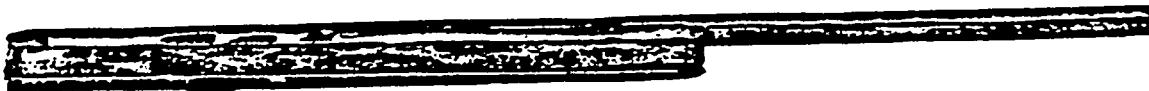
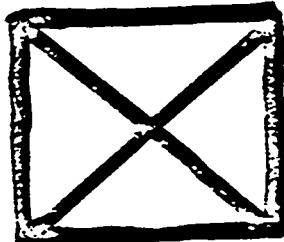
<u>Losses</u>	<u>Quantity (kg)</u>	<u>% Total</u>
Escapage		
- Long-term structural	523	1.6
- Mercury flasks (loss in "empty" flasks)	42	0.1
Subtotal	<u>10,664</u>	<u>(33.5)</u>
TOTAL	31,780	100.0%

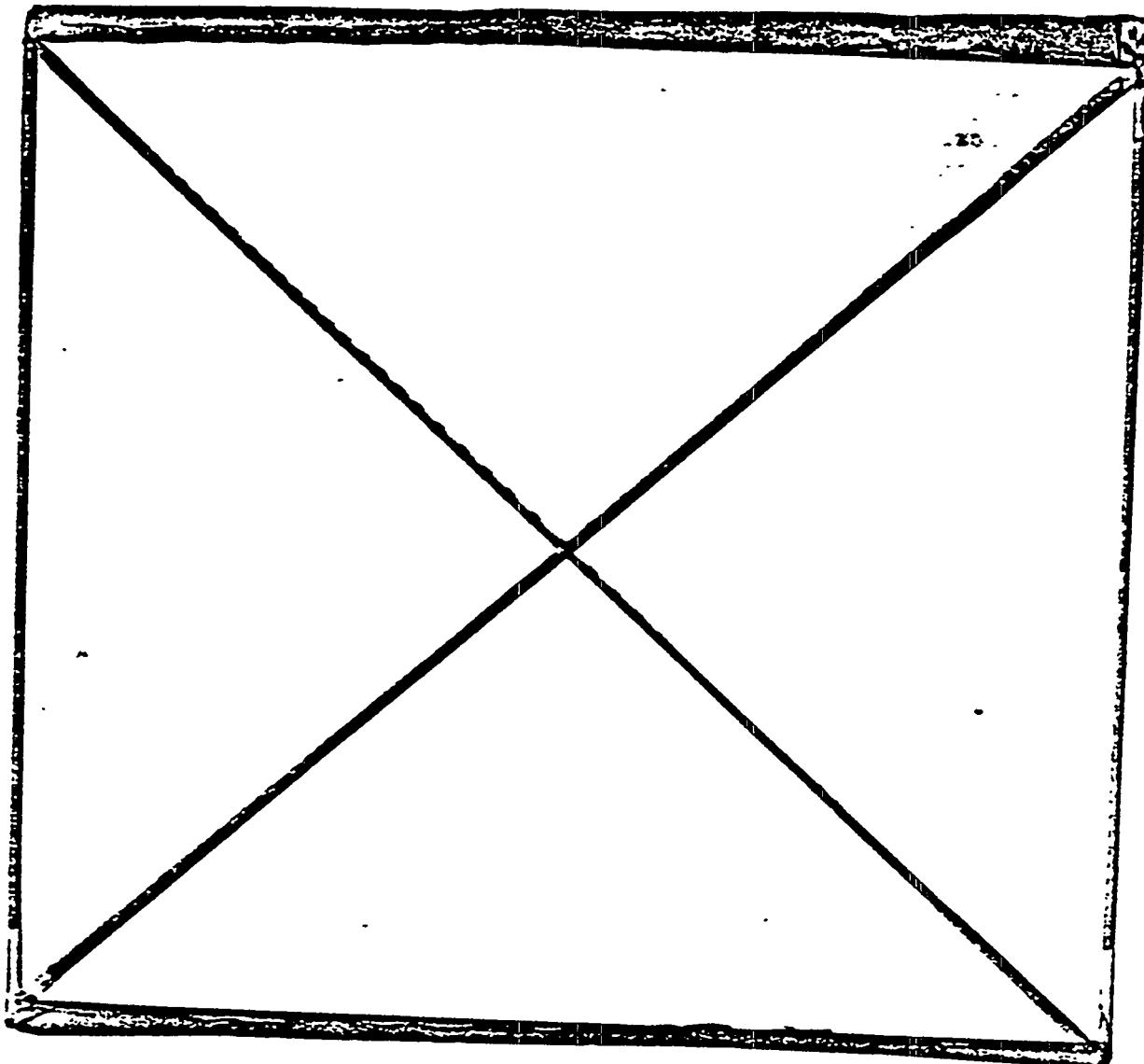
The chlor-alkali mercury cell process resembles both the Elex process and the head end of the Colex process in that the mercury cell process uses sloped trays for the amalgam production. The major differences between the mercury cell and the Y-12 Plant process involve the added complexity of countercurrent flow for isotopic exchange.

The isotopic method in Elex utilized agitated trays where in Colex it was packed towers that involved amalgam pumping. The chlor-alkali industry did not have these additional steps. Consequently, direct ratioing of chlor-alkali losses to estimate Colex losses cannot provide an accurate methodology to estimate quantities of mercury lost to structural members and process equipment holdup. However, this data can be used to estimate minimum values that are likely to be held up in buildings and process equipment and provide insights as to where unaccounted-for mercury may have gone. In a typical chlor-alkali plant, loss to structural members was 1.6% of the total make-up mercury per year. Assuming this ratio applied to the Colex and Elex processes, 1.6% of this total mercury lost or not accounted for (2,665,256 lb) would be 42,656 lb.

Building

9201-4
9201-5
9204-4

Cascade months



Mercury has been found trapped in hollow block walls when they have been penetrated for construction purposes. Leaks from these walls require regular cleanup. Mercury is also trapped in equipment insulation. Flaked paint chips, insulation, and floor coating samples taken in June 1983 have been analyzed and are shown in the following table:

FLOOR COATING, INSULATION, AND PAINT CHIPS, BUILDING 9201-4

<u>Location</u>	<u>Mercury concentration (ppm)</u>
Floor coating	1
Floor coating	2
Floor coating	3
Floor coating	4
	98
	2,600
	86
	440

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Neither of these estimating methodologies provided adequately reflects the differences in total operations involved. For example, if the Colex and Elex operations had required mercury addition according to the same ratio as the chlor-alkali mercury cell (70,075 lb addition/ 592,000 lb/inventory), the loss rate would have been about 12% per year of operation and total mercury loss per cascade year of operation would have been

Obviously, the Colex and Elex operations were much tighter than chlor-alkali industry operations, both from a design and operating standpoint since only 2,025,056 lb of mercury have been lost or not accounted for (about 14% of what would have been lost under chlor-alkali operations). Another fact indicating tighter operations is loss to the air average by a 500-TPD mercury cell would be 152 lb per month whereas with the Y-12 lithium isotope separation processes, these averaged 66.7 lb per cascade month of operation (38,000 lb from Colex plus 8,300 lb from Elex divided by 694 cascade month).

Consequently, the methodology for estimating loss to structural members (buildings) assumed that one cascade month of operation lost an equivalent amount of mercury to structural members as an operating month for a 500-TPD mercury cell (1,153 lb/year divided by 12 months/year), 96 lb/month.

The following table shows losses to buildings at a rate of 96 lb per cascade month.

<u>Building</u>	<u>Cascade months operation</u>	<u>Lost to building (lb)</u>
9201-4	290	27,840
9201-5	336	32,250
9204-4	68	<u>6,520</u>
		<u>66,610</u>

Mercury has been found trapped in hollow block walls when they have been penetrated for construction purposes. Leaks from these walls require regular cleanup. Mercury is also trapped in equipment insulation. Flaked paint chips, insulation, and floor coating samples taken in June 1983 have been analyzed and are shown in the following table:

FLOOR COATING, INSULATION, AND PAINT CHIPS, BUILDING 9201-4

	<u>Location</u>	<u>Mercury concentration (ppm)</u>
Floor coating	1	98
Floor coating	2	2,600
Floor coating	3	86
Floor coating	4	440

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<u>Location</u>	<u>Mercury concentration (ppm)</u>	
Wall paint	1	55
Wall paint	2	281
Wall paint	3	71
Wall paint	4	19
Insulation	1	26
Insulation	2	4
Insulation	3	24
Insulation	4	1,300, 15,000
Insulation	5	150
Insulation	6	110
Insulation	7	76
Insulation	8	67, 300
Insulation	9	87,000, 330,000
Insulation	10	140

The wall, equipment insulation, and floor coatings trapped mercury and can be considered part of the loss to structural members (spills are not part of this classification). The wall and floor coatings coupled with a regular cleaning program probably helped reduce the losses to structural members below what was experienced in the chlor-alkali industry. Mercury from cleaning operations went into the building drain systems.

SUMMARY OF ESTIMATED LONG-TERM STRUCTURAL MEMBER LOSSES

<u>Building</u>	<u>Quantity (lb)</u>
9204-4	
9201-4	
9201-5	
TOTAL	66,610

4.6.3 Mercury in Building Drain Systems

The process drain system is still intact in Building 9201-4, and it is known that mercury is trapped in it due to past experience of dismantling the process equipment in Building 9201-5 and analysis of selected components in 9201-4 after triple flushing with water when Building 9201-4 was drained. The quantity of mercury in the process area drain lines cannot be calculated due to lack of data pertaining to it.

Building drain systems (storm sewer) from the mercury process buildings have been observed to trap pockets of metallic mercury in bell joints and in junction boxes. Sediments and debris in the storm sewer system are contaminated with mercury. Turner estimated, by visual inspection, that a 48-in. storm sewer line west of Building 9201-4 contained a considerable amount of metallic mercury in

the bell joints alone, possibly a ton in that one line. Smith observed large pools of mercury in a drain line west of Building 9204-4.

Mercury finds its way into the fan rooms and the sumps, and in fact, one sump in Building 9201-4 was found to contain about 6,500 lb of metallic mercury. If the mercury level ever got high enough to enter the suction of the sump pump, it would have been dispersed into small globules and carried away with the water. Whether this ever happened is not known. Based on visual inspection of selected drain lines and drain line junction boxes, it is estimated that about 5,000 lb of metallic mercury are still in the storm sewer system.

4.6.4 Additional Losses to the Air

The Nichols-Hershoff furnace used in the mercury recovery process had initial operating problems with respect to the condensing system and was shut down for repair and modification. Following this, mercury losses through the stack were sampled and analyzed to be insignificant.

Prior to this, however, LaFrance said that mercury vapor concentration in the air surrounding this outside installation pegged his mercury vapor meter at least once. The quantity of airborne release cannot be estimated because data do not exist that give mercury concentration and quantities of feedstock to the furnace.

4.6.5 Other Potential Losses to Air and Ground

Another potential additional air loss is vaporization of mercury from decommissioned equipment being stored in the salvage yard awaiting disposal. Mercury can also be lost to the ground in the salvage area when scrap is moved. It was the practice to have operating crews vacuum up mercury spilled on the roads leading to the salvage yard, on the salvage yard, and on roads leading from the Y-12 Plant where this equipment had been removed. Additional mercury could have been lost to the ground during movement of process equipment such as pumps to maintenance areas.

4.6.6 Theft

Theft was not a major loss mechanism. However, mercury was a valuable commodity to sell, and small amounts represented many pounds. One incident was reported when employees of Rust Engineering were stealing mercury when Building 9201-5 was being modified in 1969. The building was fenced outside the plant to facilitate these modifications. The FBI arrested two persons and they were arraigned and later convicted (Knoxville News Sentinel, June 4, 1969). Approximately 100 lb of mercury were taken in this incident.

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4.7 QUANTITY TOTALS ACCOUNTED FOR AND NOT ACCOUNTED FOR

4.7.1 Summary of Information

Tables 4.3 and 4.9 summarize the mercury material balance activities of the 1983 Mercury Task Force. The data are presented in the same format used in the June 9, 1977, letter to the U.S. Energy Research and Development Administration (ERDA) (Ref. 10).

Table 4.6. Mercury accountability

	Best estimate June 20, 1983 (lb)	Best estimate June 9, 1977 report (lb)
<u>Vouchered in to Y-12</u>	24,348,852	24,321,000
<u>Accounted for:</u>		
Returned unopened + bottled + stored	21,666,384 ^a	
In LiOH tails, sold + stored	1,400	1,000
In 9201-5 scrap, sold	14,000	10,000
In 9201-5 sludge, sold to Mallory	174,000	111,000
As flasking coverage, "given" to GSA	17,212	12,000
In equipment, still in place	200,000	
In sludges and sumps, 9201-4	250,000	100,000
In 9201-2 sewer pipe, recovered to ORNL	800	
Total "Accounted for"	22,323,796	21,883,248
<u>Lost or not accounted for:</u>	2,025,056	2,437,752
"Lost" to air	51,300	30,000
"Lost" to East Fork Poplar Creek	238,944	470,000
"Lost" to New Hope Pond sediment - Chestnut Ridge	6,629	7,200
"Lost" to New Hope Pond sediments now in place	8,475	-
"Lost" to ground, 9201-5 spill accident	49,853	49,853
"Lost" to ground, 7 other spills	375,000	-
"Lost" to ground, 81-10 operations	3,000	-
Total "Lost"	733,201	557,053
Total "Not accounted for"	1,291,855	1,880,699

^a6,404,900 lb remains in storage at Y-12.

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4.7 QUANTITY TOTALS ACCOUNTED FOR AND NOT ACCOUNTED FOR

4.7.1 Summary of Information

Tables 4.8 and 4.9 summarize the mercury material balance activities of the 1983 Mercury Task Force. The data are presented in the same format used in the June 9, 1977, letter to the U.S. Energy Research and Development Administration (ERDA) (Ref. 10).

Table 4.8. Mercury accountability

	Best estimate June 20, 1983 (lb)	Best estimate June 9, 1977 report (lb)
<u>Voucherred in to Y-12</u>	[REDACTED]	24 million [REDACTED]
<u>Accounted for:</u>		
Returned unopened + bottled + stored	[REDACTED] a	[REDACTED]
In LiOH tails, sold + stored	[REDACTED]	[REDACTED]
In 9201-5 scrap, sold	14,000	10,000
In 9201-5 sludge, sold to Mallory	174,000	111,000
As flasking overage, "given" to GSA	[REDACTED]	[REDACTED]
In equipment, still in place	200,000	[REDACTED]
In sludges and sumps, 9201-4	250,000	100,000
In 9201-2 sewer pipe, recovered to ORNL	800	[REDACTED]
Total "Accounted for"	[REDACTED]	[REDACTED]
<u>Lost or not accounted for:</u>	2,025,056	2,437,752
"Lost" to air	51,300	30,000
"Lost" to East Fork Poplar Creek	238,944	470,000
"Lost" to New Hope Pond sediment - Chestnut Ridge	6,629	7,200
"Lost" to New Hope Pond sediments now in place	8,475	-
"Lost" to ground, 9201-5 spill accident	49,853 ✓	49,853 ✓
"Lost" to ground, 7 other spills	375,000 ✓	-
"Lost" to ground, 81-10 operations	3,000	-
Total "Lost"	733,201	557,053
Total "Not accounted for"	1,291,855	1,880,699

a [REDACTED]

Table 4.9. 1,291,855 lb Mercury not accounted for: speculations and notions

<u>Not accounted for:^a</u>	1,291,855 lb ^a
<u>Speculations:</u>	
Y-12 did not receive vouchered amount (2.4)	500,000 (██████████ shipping shortage)
Given to GSA from Y-12 inventory when leakers were reflasked (2.4.2)	██████████ (██████████ shipping shortage)
Sold with sale of old used mercury flasks (4.5.2)	██████████
Absorbed in buildings structure (4.6.2)	60,000
In buildings drain systems (4.6.3)	5,000
Possible error in our Building 9201-5 scrap estimate ^b	<u>40,000</u>
- "Lost" to the ground during transport to maintenance shops	
- "Lost" to the ground during transport of scrap yard	
- "Lost" to the ground in salvage yard	
- "Lost" to the air in salvage yard	
- Theft	
TOTAL	645,000 lb

^a In studying losses of mercury in chlor-alkali plants, EPA, in 1975, treated air losses, water losses, land losses, product losses, theft, high-level wastes, and "long-term structural" (buildings) estimates in their total materials balance as material accounted for.

^b A local scrap dealer who bought part of this equipment scrap has recently reported that he salvaged 20,000 lb of mercury from the Building 9201-5 scrap, and also, he said that another dealer salvaged 34,000 lb from the scrap for a total of 54,000 lb. This is contrasted to our current estimated "loss" of 14,000 lb. We have no confirmation for this number.

4.7.2 Uncertainties and Confidence Intervals

It is desirable to have some idea or feel for the uncertainty associated with each quantity of mercury summarized in the material balance. Ideally, such uncertainty would be presented in the form of a confidence interval calculated from the observed variation in the measurement data. Unfortunately, for most of the quantities presented in Section 4.7.1, no measurement data were available; therefore, it was not possible to calculate confidence intervals in the usual way.

Two methods for dealing with the statistical problems produced by the lack of measurement data are used in this report. The first method, which is used throughout Sections 2, 3, and 4, is to discuss the qualitative factors known to affect the value of each of the quantities summarized in Section 4.7.1. Unfortunately, while this method does provide the reader with some information that can be used

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Table 4.9. 1,291,855 lb Mercury not accounted for: speculations and notions

<u>Not accounted for:</u> ^a	1,291,855 lb ^b
<u>Speculations:</u>	
Y-12 did not receive vouchered amount (2.4)	
Given to GSA from Y-12 inventory when breakers were reflasked (2.4.2)	500,000 (2% shipping shortage) + 20,000 (2% shipping shortage)
Sold with sale of old used mercury flasks (4.5.1)	20,000
Absorbed in buildings structure (4.6.2)	60,000
In buildings drain systems (4.6.3)	5,000
Possible error in our Building 9201-5 scrap estimate ^b	40,000
- "Lost" to the ground during transport to maintenance shops	
- "Lost" to the ground during transport of scrap yard	
- "Lost" to the ground in salvage yard	
- "Lost" to the air in salvage yard	
- Theft	
TOTAL	645,000 lb

^aIn studying losses of mercury in chlor-alkali plants, EPA, in 1975, treated air losses, water losses, land losses, product losses, theft, high-level wastes, and "long-term structural" (buildings) estimates in their total materials balance as material accounted for.

^bA local scrap dealer who bought part of this equipment scrap has recently reported that he salvaged 20,000 lb of mercury from the Building 9201-5 scrap, and also, he said that another dealer salvaged 34,000 lb from the scrap for a total of 54,000 lb. This is contrasted to our current estimated "loss" of 14,000 lb. We have no confirmation for this number.

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to assess the credibility of a particular quantity, it does not yield numerical statements in many cases. For this reason, a second method, an application of the DELPHI technique to the problem of finding confidence intervals, is also used.

Basically, the DELPHI technique is a method of obtaining from a group of experts a consensus of opinion about the answer to a given question of interest. The answer obtained from the group by this technique is often more credible than the answer obtained from any one individual. Many variations of the technique are described in the statistical literature, but each variation relies on the same basic sequence of steps. First, the opinion of each expert in the group is obtained individually. After all the opinions have been obtained, they are analyzed and combined. Each expert is then shown the combined opinions and given the opportunity to change his or her opinion; these opinions from the second round are then combined. In some variations of the technique, the procedure is stopped at this point; in others, the procedure is repeated until some predetermined stopping rule is satisfied (i.e., each expert is no longer willing to change his or her opinion).

The variation of the DELPHI technique employed for this report was to obtain from a panel of seven members of the Mercury Task Force their estimates about the end points of 95% confidence intervals on each of the quantities of mercury summarized in the material balance in Section 4.7.1. No restrictions were imposed regarding symmetry of intervals and each person was free to choose whatever statement seemed most likely to them. The panel whose opinions were used consisted of three statisticians, two engineers, one chemist, and one accountant. All members of the panel have been on the 1983 Mercury Task Force since it was formed May 20, 1983, and three of the members have had significant amounts of additional prior involvement with many of the issues addressed by the task force. After all estimates had been obtained, they were averaged, and the averages were then shown to the panel, some of whom then modified their original estimates. New averages were then obtained, based on the second round of estimates. Confidence intervals for all except four subtotals were estimated this way. The lengths of the intervals obtained from the new averages were then divided by four to give an "estimate" of the standard deviations of each of the quantities for which a confidence interval was obtained.

Confidence intervals for the remaining four subtotals were calculated by adding and subtracting twice the standard deviation of the subtotal. The standard deviation of each subtotal was estimated by the square root of the sum of the squares of the appropriate standard deviations for the terms included in the subtotal.

The confidence intervals obtained by the techniques first described are presented in Table 4.10; the confidence intervals for the subtotals are footnoted. All other confidence intervals were obtained by the DELPHI technique previously described.

It should be noted that many of the confidence intervals are not symmetric. This reflects the fact that many of the quantities are known to be either biased or conservative. For instance, the quantity ~~vouchered into Y-12~~ is almost certainly larger than the

Table 4.10. Summary mercury accountability

	DELPHI 95% confidence intervals		
	Best estimate June 20, 1983 (lb)	Lower value	Upper value
<u>Vouchered in to Y-12</u>			
<u>Accounted for:</u>			
Returned unopened, bottled, or stored In L10H tails, sold, or stored			
In 9201-5 scrap, sold	14,000	11,400	50,000
In 9201-5 sludge, sold to Mallory	174,000	163,000	210,600
As flasking overage, "given" to GSA			152
In 9201-4 equipment, still in place	200,000	161,400	256,400
In sludge and slumps 9201-4	250,000	193,200	317,500
In 9201-2 sewer pipe, recovered to ORNL	800	762	866
Total "Accounted for"			a
<u>Lost or not accounted for:</u>			
2,025,056	1,733,348 ^a	2,316,764 ^a	
"Lost" to air	51,300	44,700	78,600
"Lost" to East Fork Poplar Creek	238,944	209,844	317,044
"Lost" to New Hope Pond sediment -	6,629	3,679	14,104
Chesnut Ridge			
"Lost" to New Hope Pond sediment	8,475	6,615	12,695
now in place			
"Lost" to ground from 9201-5 spill accident	49,853	43,113	59,503

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Table 4.10. Summary mercury accountability

	Best estimate June 20, 1983 (lb)	DELPHI 95% confidence intervals		
		Lower value	Upper value	
Vouchered in to Y-12	24,348,852	23,870,852	24,430,852	
<u>Accounted for:</u>				
Returned unopened, bottled, or stored	21,666,384	21,664,284	21,668,482	
In LiOH tails, sold, or stored	1,400	994	1,880	
In 9201-5 scrap, sold	14,000	11,400	50,000	
In 9201-5 sludge, sold to Mallory	174,000	163,000	210,600	
As flasking coverage, "given" to GSA	17,212	16,812	17,612	
In 9201-4 equipment, still in place	200,000	161,400	256,400	
In sludge and sumps 9201-4	250,000	193,200	317,500	
In 9201-2 sewer pipe, recovered to ORNL	800	762	866	
Total "Accounted for"	22,323,796	22,241,980 ^a	22,405,612 ^a	
<u>Lost or not accounted for:</u>				
"Lost" to air	2,025,056	1,733,348 ^a	2,316,764 ^a	
"Lost" to East Fork Poplar Creek	51,300	44,700	78,600	
"Lost" to New Hope Pond sediment -	238,944	209,844	317,044	
Chestnut Ridge	6,629	3,679	14,104	
"Lost" to New Hope Pond sediment	8,475	6,615	12,695	
now in place				
"Lost" to ground from 9201-5 spill	49,853	43,113	59,503	
accident				

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Table 4.10 (Cont.)

	Best estimate June 20, 1983 (lb)	DELPHI 95% confidence intervals	
		Lower value	Upper value
"Lost" to ground, 7 other spills	375,000	322,700	475,000
"Lost" to ground, 81-10 operations	3,000	2,450	5,300
Total "Lost"	733,201	637,993 ^a	828,409 ^a
Total "Not accounted for"	1,291,855	985,003 ^a	1,598,707 ^a

^aConfidence intervals.

amount of mercury actually received, although it may be a good estimate of the amount of mercury put into the bottles when they were originally filled. By the time the bottles actually reached Y-12, many of them had developed leaks, and less mercury was received than was sent.

The best estimate from the standpoint of quality (how well known) in the entire accounting ledger is the value given for the amount of mercury returned unopened, bottled, or stored. The records are all in hand, and the only statistical variability associated with this number comes from the weighting procedures used by Y-12 when filling the bottles. This variability is very precisely known because it is based on extremely good measurement data. The confidence interval given for this number in Table 4.10 is based on the DELPHI technique. A better interval, which is based entirely on measurement data described in Section 3.1, is:

A major implication of this DELPHI study is that since not more than [redacted] of mercury was actually received, and since [redacted] was returned, there can be no more than about 2.7 million lb for which Y-12 must account. The figure 2.7 million lb represents an upper bound on the amount of material that must be accounted for by all the other entries in the table rather than a good estimate of the amount the rest of the entries must equal. This also means, then, that the material actually unaccounted for is significantly less than 2.7 million lb because a large part of the not accounted for mercury is already explained by the other entries, such as "lost" to ground, etc. Another way of saying this is that the upper end point of a 95% confidence interval on the total of all the other entries cannot be larger than 2.76×10^6 , and the lower end point may be significantly less.

To summarize our "subjective" confidence:

MERCURY MATERIAL BALANCE
(millions of pounds)

Received	[redacted]	-0.4	+0.1
Accounted for	[redacted]	-0.1	+0.1
"Lost" to environment	<u>0.7</u>	<u>-0.1</u>	<u>+0.1</u>
Unaccounted for	1.3	-0.3	+0.3

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amount of mercury actually received, although it may be a good estimate of the amount of mercury put into the bottles when they were originally filled. By the time the bottles actually reached Y-12, many of them had developed leaks, and less mercury was received than was sent.

The best estimate from the standpoint of quality (how well known) in the entire accounting ledger is the value given for the amount of mercury returned unopened, bottled, or stored. The records are all in hand, and the only statistical variability associated with this number comes from the weighting procedures used by Y-12 when filling the bottles. This variability is very precisely known because it is based on extremely good measurement data. The confidence interval given for this number in Table 4.10 is based on the DELPHI technique. A better interval, which is based entirely on measurement data described in Section 3.1, is:

$$-21,666,384 \pm 984 \text{ lb} .$$

A major implication of this DELPHI study is that since not more than ~~-24.4 million~~ ~~lb~~ of mercury was actually received, and since ~~-21.7 million~~ ~~lb~~ was returned, there can be no more than about 2.7 million lb for which Y-12 must account. The figure 2.7 million lb represents an upper bound on the amount of material that must be accounted for by all the other entries in the table rather than a good estimate of the amount the rest of the entries must equal. This also means, then, that the material actually unaccounted for is significantly less than 2.7 million lb because a large part of the not accounted for mercury is already explained by the other entries, such as "lost" to ground, etc. Another way of saying this is that the upper end point of a 95% confidence interval on the total of all the other entries cannot be larger than 2.76×10^6 , and the lower end point may be significantly less.

To summarize our "subjective" confidence:

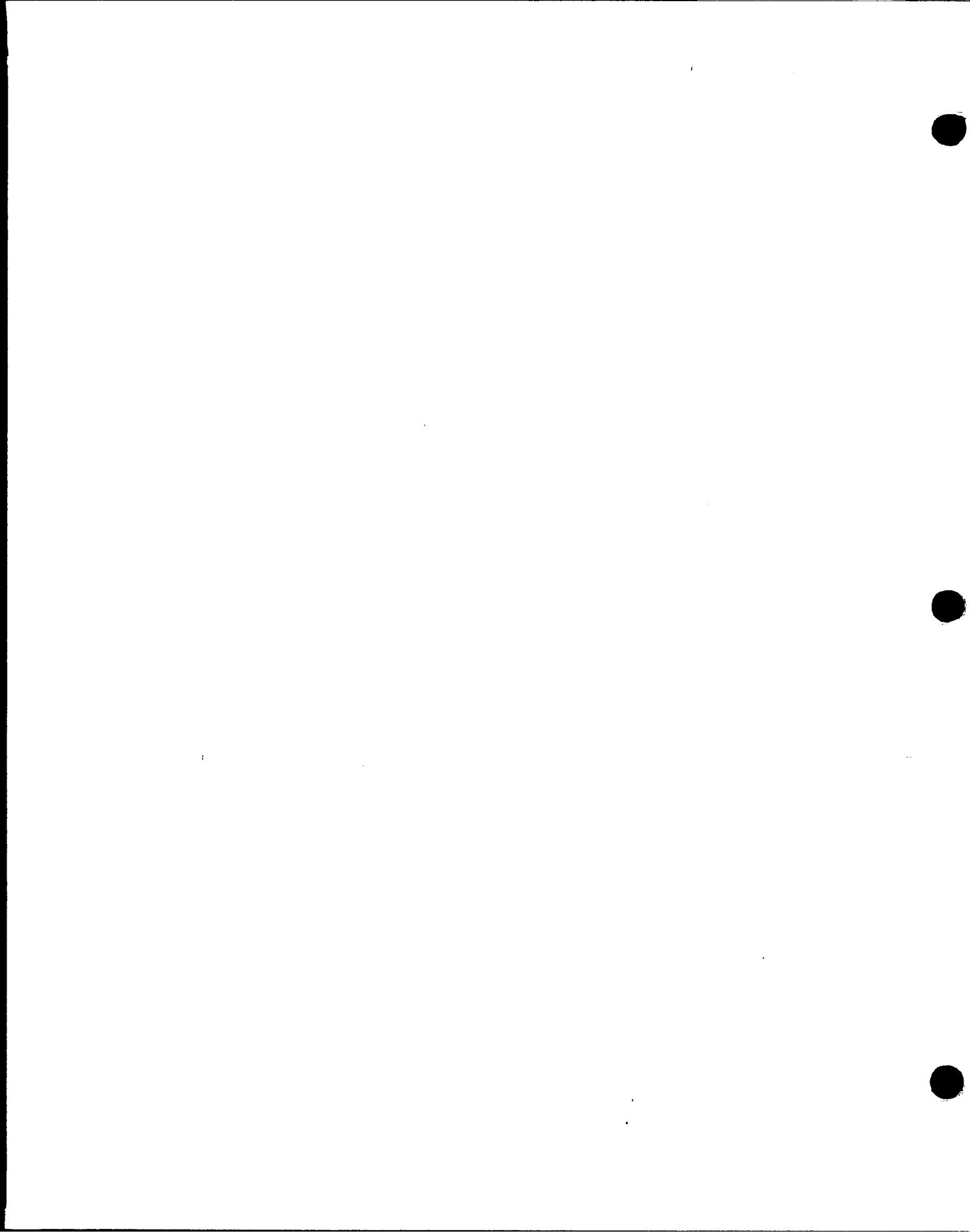
MERCURY MATERIAL BALANCE
(millions of pounds)

Received	-24.3*	-0.4	+0.1
Accounted for	-22.3	-0.1	+0.1
"Lost" to environment	<u>0.7</u>	<u>-0.1</u>	<u>+0.1</u>
Unaccounted for	1.3	-0.3	+0.3

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**5. STUDIES OF THE HEALTH OF Y-12 EMPLOYEES
EXPOSED TO MERCURY AND REVIEW OF
HEALTH PROTECTION PROGRAMS**

5. STUDIES OF THE HEALTH OF Y-12 EMPLOYEES EXPOSED TO MERCURY AND REVIEW OF HEALTH PROTECTION PROGRAMS

5.1 PROPERTIES OF MERCURY AND THEIR SIGNIFICANCE TO THE HEALTH OF PERSONS EXPOSED TO MERCURY

5.1.1 Properties of Mercury

The following information was quoted directly from the American National Standard Institute's (ANSI) April 18, 1972, publication entitled "Acceptable Concentrations of Inorganic Mercury and Non-Alkyl Organo Compounds."

General Properties

Mercury, the only common metal which is liquid at ordinary temperatures, is mobile, silvery white, and does not tarnish in air. It is used in the manufacture and use of chemicals and scientific instruments; in the preparation of dental and other amalgams; in battery manufacturing; in the electrical and explosives industries; and in the manufacture of chlorine. Mercury may be also encountered in significant amounts in mining; scientific, medical, and testing laboratories; and thermometer manufacturing. Organomercury compounds are used as fungicides, diuretics, or as fungistats in paints. Mercury is unique among metals in existing as a vapor at ordinary temperatures in concentrations sufficiently high to be of health concern. The need for good housekeeping and the cleanup of spills is important. The compounds of mercury vary widely in solubility, vapor pressure, and other properties.

Physical-Chemical Properties of Pure Mercury

Atomic weight:	200.61
Specific gravity of liquid mercury:	13.546 20/20°C
Freezing point:	-38.87°C
Boiling point:	356.9°C
Vapor pressure:	0.000185 mm at 0°C
	0.001201 mm at 20°C
	0.01267 mm at 50°C

Toxic Properties

Mercury and its compounds may enter the body by inhalation, ingestion, or absorption through the skin. The rate of absorption through the intact skin has been shown to be very slow, however, and this route of absorption is presently thought to be of relatively little importance. Mercury

allowed to remain on skin and clothing can greatly increase the quantity of mercury ingested or inhaled.

The principal effects of chronic exposure to mercury and its compounds involve the central nervous system, and include at concentrations which have been observed in the industrial environment, psychological disturbances and tremor (Ref. 1). The condition known as erethism (*erethismus mercurialis*) has frequently been reported and is characterized by excessive irritability (or sensibility to stimulation) (Ref. 2).

Oral intake of mercury compounds can result in severe kidney injury and damage to the gastrointestinal system; air concentrations sufficient to cause such effects are, fortunately, rarely encountered. It has also been reported (Refs. 3, 4, 5) that the inhalation of very high concentrations of mercury vapor can result in a mercurial pneumonitis. Proteinuria from chronic exposure to lower levels of mercury has been reported (Ref. 6), as well as nephrotic syndrome (Ref. 7), but available evidence is conflicting, and at least one large-scale study of chlorine workers exposed to mercury showed that neither proteinuria nor other evidence of kidney injury or function impairment was related to mercury-vapor exposures as high as 0.27 mg/m^3 (Ref. 8).

Other symptoms which have been reported include gingivitis and stomatitis, and occasionally dermatitis, but as noted before, individual studies are frequently conflicting in regard to these and similar effects.

5.1.2 Clinical Symptoms of Overexposure to Mercury

The symptoms of high-level exposure to mercury, which cause a most immediate effect (i.e., acute exposure), are different from those from extended exposure to relatively low levels (i.e., chronic exposure).

Acute effects of exposure to mercury have been reported by the American Congress of Governmental Industrial Hygienists (ACGIH) as being damaging to the kidney, lung, mouth, and intestinal tract resulting in such symptoms as "pneumonitis, bronchitis, chest pains, dyspnea, and coughing, as well as stomatitis . . . a variety of gastrointestinal symptoms and severe anuria and uremia" (Refs. 9 and 10).

The clinical symptoms of chronic mercurialism are quite different, resulting chiefly from the effect of mercury on the central nervous system. Many of the early signs and symptoms of chronic overexposure to mercury are nonspecific, including such things as weakness, loss of weight and appetite, insomnia, and gastrointestinal disturbance (Refs. 8, 9, 11, and 12). Another effect is erethism, which is characterized by irritability, excitability, shyness, headaches, and indecision (Refs. 11 and 13). All these symptoms are so nonspecific

that they may be overlooked in an individual case; however, they become more prevalent with increased level and length of exposure, and symptoms that are more specific to chronic mercurialism are likely to appear. Such symptoms as tremors (Refs. 11 and 14), inflammation of the gums, and loose teeth are symptoms of chronic excessive occupational exposures.

5.2 STANDARDS USED FOR PROTECTION OF WORKERS EXPOSED TO MERCURY 1950 - 1983

5.2.1 History of Air Standards for Metallic Mercury and Vapors

Although mercury vapor had long been recognized as a source of occupational poisoning, the first official standards for controlling mercury vapor concentrations in U.S. factories were made in the 1940s. In 1943 the American Standard Association (ASA) recommended a standard of 0.1 mg/m^3 (Ref. 15). In 1946 the ACGIH recommended a threshold limit value (TLV) of 0.1 mg/m^3 (Ref. 16). Both of these recommendations were based on studies by Neal and others of workers in the felt hat and fur cutting industries (Refs. 9, 17, and 18). Neal concluded that there were no cases of mercury poisoning among workers exposed to less than 0.1 mg Hg/m^3 , but that cases did appear above this level. He also found that the incidence of mercury poisoning increased with the length of occupational exposure.

These criteria remained in effect for almost 30 years. When the Y-12 Plant began using large quantities of mercury in the 1950s, the then current standard of 0.1 mg/m^3 was used and remained in effect throughout the production period which ended in 1963.

In 1968 a Mercury Compounds Subcommittee of the Permanent Commission and International Association on Occupational Health met in Stockholm (Refs. 10, 19, and 9) and suggested a standard or Maximum Allowable Concentration (MAC) in air of 0.05 mg/m^3 for elemental mercury that was one-half of the previous standard. The report of the subcommittee made this statement about the concentration in air as compared to symptoms of mercury poisoning:

When numerical values for MAC (standard) values are considered, it is obvious that there exist little epidemiological data which provide scientifically satisfactory information about detailed dose-response relationships in man, even for a single mercury compound. The group has accepted the philosophy of an informed estimate, provided enforcement of the proposed MAC values is combined with medical supervision of the workers exposed. This approach seems to be particularly applicable for exposure to substances belonging to Category 2 (includes mercury vapor) . . . , in which early symptoms can be detected and usually are reversible.

In 1970 Smith issued a comprehensive report (Ref. 8) on experience in the chlor-alkali industry that showed there were dose-response relationships among workers and that the frequency of symptoms increased with exposure level. Some thought the relationships indicated that there were adverse effects below the 0.1 mg/m^3 exposure level. Smith had this to say about the application of his results and the implications of the data he reported:

The implications of the results of this study on the current threshold limit value of 0.1 mg Hg/m^3 are to some extent dependent on matters of judgment rather than fact. The data indicate that with respect to most of the symptoms (complaints reported by workers), the dose-response relationship does not exhibit sufficiently high incidence to warrant concern until the present threshold limit value is exceeded . . . The data presented here show no signs or symptoms in persons exposed to mercury vapor at or below a level of 0.1 mg Hg/m^3 . However, the data do raise a question regarding the adequacy of the safety factor provided by a TLV of this magnitude.

Based on the actions at the Stockholm meeting and reevaluation of the existing information, it became the consensus that while persons exposed below the 0.1 mg Hg/m^3 level showed no signs or symptoms of mercurialism, the data raised a question regarding the adequacy of the safety factor provided by this TLV.* As a result, the ACGIH lowered the TLV for elemental mercury to 0.05 mg/m^3 in 1971 (Ref. 20). The Y-12 Plant adopted this lower value in 1973 (Ref. 21). The ANSI lowered its standard to 0.05 mg/m^3 in 1982 (Refs. 9 and 22). It should be noted that not all who studied the results agreed with this consensus. The authors of the National Institute for Occupational Safety and Health (NIOSH) mercury criteria document appeared to think that signs and symptoms of mercurialism were experienced at exposure levels below 0.1 mg/m^3 (Ref. 9).

The current mercury in air standard for mercury established under the Occupational Safety and Health Act (OSHA) is a ceiling limit of 1.0 mg Hg/10 m^3 (Ref. 23).

The current standard for the Department of Energy (DOE) contractor use as prescribed by DOE Order 5480.1.A (August 31, 1981), "Environmental Protection, Safety, and Health Protection Program for DOE Operations," Chapter 1, "Environmental Protection, Safety, and Health Protection Standards," Section 8, "Health Protection," paragraph C, "Industrial Hygiene," is "(a) Current Threshold Limit

*Nomenclature of mercury air standards is discussed later in this section. Prior to about 1970, the general convention and the Y-12 practice was to refer to MACs. Since that time, the practice has been to use the TLV nomenclature.

Values (ACGIH)." The value as listed in "TLVs, Threshold Limit Values for Chemical Substances in Work Air Adopted by ACGIH for 1982" is a TLV-time-weighted averages (TWA) of 0.05 mg/m^3 for all mercury vapors except alkyl forms.

Table 5.1 shows mercury standards in a tabular form.

Mercury Vapor Standards and Guidelines Nomenclature

The standards for mercury and other chemical substances in the work environment have traditionally been expressed by the ACGIH as TLVs defined as the TWA concentration for an 8-hour-per-day, 40-hour-per-week working period to which nearly all workers may be exposed day after day for a full working lifetime without adverse effects (Ref. 24). It is noted that the ACGIH states that the TLV-TWA should not be used as a fine line between safe and dangerous concentrations.

Other groups that set standards or guidelines may not use the same nomenclature, but the standards have basically the same meaning (Refs. 22 and 23).

In Y-12, various terminology has been used to express standards or guidelines. This expression for chemical substances has the same meaning as the TLV-TWA.

For many years there was only one standard for mercury vapor and compounds. However, in recent years different limits have been established.

In 1976, the ACGIH started listing its TLVs for mercury as two values: TWA, as has already been explained, and TLV-Short-Term Exposure Limit (STEL). The STEL is the concentration to which a worker can be exposed continuously for a short period of time without suffering from irritation, chronic or irreversible tissue damage, and narcosis of sufficient degree to increase the likelihood of accidental injury. It is defined as a 15-min TWA which should not be exceeded at any time during the work day, even if the 8-h TWA is within the limit.

The ACGIH has also published, for some substances, the TLV ceiling, which is the concentration that should never be exceeded for methylmercury and for certain organic and inorganic salts of mercury. The 1982 TLVs published by the ACGIH were as follows:

<u>Mercury</u>	Adopted Values (mg/m^3)	
	TWA	STEL
Alkyl compounds	0.01	0.03
All forms except alkyl vapor	0.05	
Aryl and inorganic compounds	0.1	

Table 5.1. Chronology of mercury vapor exposure guidelines/standards

Year	Organization	Guideline/standard	
		Air (mg Hg/m ³)	Urine (mg Hg/L)
1943	American National Standards Institute	0.1	
1946	American Conference of Governmental Industrial Hygienists	0.1	
1957	University of Rochester reports prepared under AEC contract	0.1	0.3
1968	A committee of the International Symposium on Maximum Allowable Concentrations of Toxic Substances Industrial Environments	0.05	
	- For aryl and inorganic compounds	0.1	
	- For alkyl compounds	0.01	
1971	American National Standards Institute	0.1	
1971	American Conference of Governmental Industrial Hygienists		
	- For alkyl compounds	0.01	
1972	American National Standards Institute	0.05	
1972	Occupational Safety and Health Act of 1976	1.0 mg Hg/10 m ³ (Ceiling value not to be exceeded)	
1973	National Institute for Occupational Safety and Health	0.05	
1976	American Conference of Governmental Industrial Hygienists		
	- All forms except alkyl		
	Threshold Limit Values/TWA	0.05	
	Short-Term Exposure Limit (STEL)	0.15	
	- For alkyl forms		
	Threshold Limit Values/TWA	0.01	
	Short-Term Exposure Limit (STEL)	0.03	
1982	American Conference of Governmental Industrial Hygienists		
	- All forms except alkyl (TWA)	0.05	
	- For aryl and inorganic compounds (TWA)	0.1	
	- For alkyl forms (TWA)	0.01	
	Short-Term Exposure Limit (STEL)	0.03	

It is noteworthy that there is no STEL for vapor. There was such a value for the period from 1976 through 1981. However, this type of TLV was eliminated from the 1982 TLVs by the ACGIH. It is also noteworthy that the limit for aryl and inorganic compounds was raised to 0.1. It had been the same as the limit for vapor for the period from 1971 through 1982.

5.2.2 History of Urine Standards

Urinary mercury excretion rates correlate well with mercury exposures for groups of workers but do not correlate well for individuals. Medical symptoms do not correlate well with urine excretion rates, and accordingly, no widely accepted "standards" are available. Some observers have suggested that levels of mercury in urine ranging from 0.1 to 0.5 mg/L (Ref. 25) have clinical significance. The ratio of the concentration of mercury in urine in units of mg/L as it compares to concentration in air in mg/m³ has been reported in the literature to average from 1 to 3 (Refs. 9, 18, 26, 27, 28, 29, and 30). Ratios for individuals naturally show more variability than these averages.

Even though there is no consensus among the experts on a standard for use in urinary mercury levels, many industries that have mercury workers do conduct mercury urinalysis programs on these employees, and the latest Hygienic Guide Series on mercury (Ref. 25) states that "periodic examination of urine for mercury is of value."

5.2.3 Standards Used in Y-12

As a standard for mercury in air, 0.1 mg/m³ was used in Y-12 from the onset of the program through March of 1973. At that time, the standard was changed to 0.05 mg/m³ to comply with a recently issued TLV by the ACGIH. For urine, the plant action value (PAV) of 0.3 mg/L was adopted early in the program. That action value has been continued until the present date.

5.3 SYNOPSIS OF THE MERCURY PROBLEM IN THE LITHIUM ISOTOPE SEPARATION CASCADES

Mercury was used in quantities totaling several hundred thousand pounds in the pilot plants operated in the 1950-1955 period at Y-12. Production plants using millions of pounds of mercury were operated at Y-12 from August 1953 to May 1963. The Y-12 Plant personnel exposure to mercury was and is almost entirely to the metal vapor. Although relatively small amounts of inorganic mercury compounds were by-products of these operations, their exposure potential was judged to be inconsequential relative to that from metallic vapor. No methylmercury or other organic compounds in quantities of health significance were associated with any of these processes. Consequently, the rest of this section will concern itself with metal and metal vapor and will characterize the potential mercury hazard, the

controls used to minimize this potential, and the studies and programs done to evaluate the effectiveness of these controls.

As an example of the degree of the mercury air contamination associated with the development program, it was noted that ~700 air samples were taken with 41% of the results being in excess of the TLV of 0.1 mg/m^3 . These samples averaged 0.13 mg/m^3 (Ref. 31).

The Elex process, developed by the Oak Ridge National Laboratory (ORNL) in 1950 and 1951, utilized large, horizontal, fully closed trays for the exchange process. The lithium amalgam flowed by gravity under relatively low pressures. Leaks and spills of amalgam or mercury did occur, and work place contamination was encountered. As an example, a review of reports on the Elex operations in Building 9204-4 revealed that the highest quarterly air levels were experienced in the second quarter of 1954. During that quarter, 2,191 air samples averaged 0.10 mg/m^3 . Thirty-six percent of the 1,049 samples taken in the "top tray" area exceeded the TLV-TWA of 0.1 mg/m^3 . Similarly, mercury urinalysis results for the third quarter of 1954 showed 248 samples from 219 people working in the building. Ten percent of these were above the PAV of 0.3 mg/L , and they averaged 0.13 mg/L . The potential hazards involved in use of mercury were recognized and studied, and steps were taken to maintain the vapor contamination in the work place at an acceptably low level.

The Colex production cascades, however, involved extremely large volumes of both mercury and amalgam flowing at relatively high rates and pressures through numerous pumps, pipes, and the attendant flanges, valves, connectors, and seals. Leaks occurred, and mercury or amalgam drips, seepage, and spills were common. The mercury losses were exacerbated by the high frequency of equipment changeout required in the early years of the operation, 1955 and 1956. Thus the amount of mercury that could vaporize into the air was significantly higher in the Colex cascades in Buildings 9201-4 and 9201-5 than for the Elex process in Buildings 9204-4, 9201-2, and 9733-2.

The stripping (teardown and disposal) of the pilot plants in Buildings 9201-2 and 9202 and in the 9204-4 Elex production plant was completed in 1958. The 9201-5 Colex production plant was stripped and decontaminated in 1965 and 1966. Production was stopped in the 9201-4 Colex production plant in December 1962. The 9201-4 plant was put on standby, the mercury was drained, and the equipment was flushed in 1967. The process equipment is still in place. Stripping of these areas, particularly 9201-5, resulted in mercury air contamination problems. The teardown and scrapping process of these buildings resulted in clutter and contamination that made it very difficult to control the mercury-in-air concentration levels. The stripping was done during the winter months so that the low temperatures would help keep mercury vapor levels down. Respiratory protective equipment use was stressed. However, air and urine results were elevated during that period.

There was a mercury bottling campaign in 1977, and although the operation and personnel exposure controls were very well planned, there were elevations in air and urinalysis data levels during these operations.

process on a continuous production basis and to uncover design flaws. This speed-up involved a series of calculated risks in that a number of the process systems were accepted from the contractor without complete testing. Even though the overall performance of the 9201-5 cascades was reasonably satisfactory, some parts of the operation needed considerable improvement (Ref. 36). For example, the failure rate of [redacted] pumps far exceeded expectations. [redacted] failures resulted in mercury spills and elevated mercury vapor contamination levels. The ventilation of amalgam makers was inadequate. Piping failures occurred because of excessive vibration. Similar problems were experienced in Building 9201-4 during its start-up during the second and third quarters of 1955.

By the third quarter of 1955, efforts were already under way to minimize mercury contamination of the building air. Work was started on building vacuum systems that would facilitate the collection of mercury spills, and the general ventilation systems were being evaluated and changed to provide more air to critical areas. Table 5.2 shows the extent to which mercury vapor concentration levels were problems during this start-up period.

Table 5.2. Percent of samples above maximum allowable concentration (TLV) of 0.1 mg/m^3

		Building 9201-5	Building 9201-4
1955	1st quarter	53.0	-
	2nd quarter	50.9	42.0
	July	88.0	93.0
	August	87.0	85.0
	September	87.0	88.0

Note: More complete discussions of these data appear later in this section.

5.6.1 The 1955 Mercury Hazard Committee (Building 9201-5 Contamination)

At a meeting on April 25, 1955, between the Alloy Development Program (ADP) Operations and Engineering organizations, a committee was appointed (Ref. 37) to review air contamination data and to find out whether the ventilation system could be upgraded to supply greater flows and reduce concentration deficiencies in Building 9201-5. On May 12, 1955, the committee recommended (Ref. 38) increasing air supply and exhaust, separating certain area ventilation use, improving distribution, spot ventilating several areas, and improving the amount of air at floor level. At the same time, the committee emphasized spill removal and good housekeeping as important factors in getting the air contamination under control.

In the committee meeting of November 21, 1955, J. C. Little, Engineering Division, reported (Ref. 39) on the 1954 design to control mercury hazards in Buildings 9201-4 and 9201-5. The original 1947 ventilation system was altered to supply cooling air to the MG sets, to maintain comfortable working conditions, and to help maintain contamination at an acceptable level. The roof exhaust fans were used to give a general air flow pattern from the ground level up to the roof where the air was discharged. So little was known about the problems that would be encountered that little attempt was made to spot ventilate particular pieces of equipment in certain areas. These alterations and additions were considered adequate at the time Buildings 9201-4 and 9201-5 were modified for the Colex installation.

By late 1955, operating experience had indicated that certain areas and pieces of equipment needed local exhaust (Ref. 40). It was found that the rate at which air was changed in Buildings 9201-4 and 9201-5 was not sufficient to maintain satisfactory mercury-in-air concentration levels because of mercury leaks. The degree of air contamination in the Colex plant buildings indicated (Ref. 41) that a concerted effort was needed to reduce the mercury vapor contamination in the Colex buildings and refine operating procedures and techniques so that operations could proceed with air levels below the then accepted TLV of 0.1 mg/m^3 . There was urgency to act quickly that fall and winter because warmer weather in the spring and summer could be expected to further increase the mercury vapor concentration and cause a potentially more serious health hazard.

In an attempt to correct the solution, both temporary and permanent alterations to the ventilation systems were designed by the Y-12 Engineering Division. These alterations were made (Ref. 42) in late 1955 by Rust Engineering. Additional exhaust fans for spot and general exhaust purposes having a capacity of ~890,000 cfm were provided for Building 9201-5. Additional exhaust fans were at ground level. Building 9201-4 was included in the improved ventilation program. The basic approach was similar to that of Building 9201-5 except that higher rates of air changes were provided in certain enclosures.

5.6.2 Plant-Wide Program to Reduce Air Contamination

In November 1955, a "crash" program was instituted to take the necessary steps to quickly reduce and maintain the mercury vapor concentration in the Colex plants below the TLV. W. C. Moore, Y-12 Technical Division Director at the time, established (Ref. 43) the Mercury Hazards Committee and appointed key members to consider all aspects of the problem, report on progress of changes in the scope of the problem, analyze suggestions, and recommend programs of action to the divisional and plant management (Ref. 44). As a result of this committee, a number of special studies were instituted during the "crash" program.

5.6.3 Shower Study

In November 1955, the Industrial Hygiene Department was requested (Ref. 45) by the Mercury Hazards Committee to conduct a test to help evaluate the need for and effectiveness of showers in mercury contamination control. The test program was instituted on November 29 and continued to December 29. Shift supervisors were monitored and the results were reported to the committee in January. The general conclusion drawn was that no quantitative statement could be made about the efficiency of showers in the lowering of mercury excretion rates even though showers were helpful in reducing skin contamination of exposed personnel (Refs. 46 and 47). This was confirmed (Refs. 48 and 49) later by a consultant, Dr. Kehoe of the Kettering Institute, University of Cincinnati, who indicated that showers would have a relatively small effect where air contamination levels are at the TLV or lower. He indicated that at high levels of contamination they are measures that can and probably should be employed. At the TLV or lower concentrations, the desirability for such actions is greatly reduced and showers should be optional.

5.6.4 The Visit to Olin Mathieson's Chlor-Alkali Plant

In mid-December 1955, G. A. Strasser (Refs. 50 and 51) arranged for three Y-12 Plant managers to visit an installation that manufactured chlorine using mercury cells.

In mid-January 1956, as part of the program to decide how to reduce air contamination levels, these managers visited the Olin Mathieson Chemical Company's chlor-alkali plant in Saltville, West Virginia, to observe what precautionary measures were employed in the handling of mercury and building and ventilation design practices. Chlor-alkali plants produce chlorine and sodium hydroxide by brine electrolysis using a mercury cathode in equipment somewhat analogous to the Elex process. It was found (Ref. 52) that during four years of operation, no employee rotation had been practiced, and no mercurialism had been observed. The plant had 40 to 50 exposed workers. Air contamination levels, which were checked once a week with a General Electric meter, averaged 0.04 to 0.06 mg/m³. Showers and clothing changes were required of exposed workers. No clinical checks or urinary mercury analyses were carried out. It was the visit to this plant where chloride solutions and mercury were both handled that first suggested the idea that a compound containing a chloride could be successfully used to suppress vapors from exposed mercury.

5.6.5 Decontamination Memo Series

As an extension of the administrative program to reduce contamination in Buildings 9201-4 and 9201-5, 11 memoranda were written suggesting specific actions that should be taken to get the problem of airborne mercury under control. These memoranda were known as the Decontamination Memo Series and were issued in January and February of 1956. In this series, it was recommended, for example, that rubber

overshoes be worn in all operational and maintenance areas (Ref. 53). Upon leaving those areas and entering either the office areas, lunchrooms, or the central control rooms, the overshoes were to be removed and deposited in a rack where they might be picked up when reentering the operation or shop areas. Shoe wash stations (Ref. 54) were installed between contaminated operating areas and clean, nonoperating areas. These devices consisted of a platform with a sunken metal box filled with brushes located in various positions. The box contained a suitable rubber cleaning solution and was designed to clean each shoe or overshoe separately and efficiently.

Other memoranda dealt with housekeeping and hygiene topics. The storage or carrying of food, cigarettes, or tobacco was limited to uncontaminated areas (Ref. 55). Usage of "Mersorb" cartridges in respirators was stipulated for workers in close contact with elevated mercury vapor or when welding contaminated material (Ref. 56). Routine daily inspection of leak collection buckets was recommended, with emphasis on maintaining a layer of water in the bucket to control mercury droplet splattering and vaporization (Ref. 57). A major memorandum explained the relationship of the surface area of exposed mercury and mercury vaporization (Ref. 58). Three methods of reducing the total surface area of mercury in the buildings were to minimize nonessential surfaces, to collect leaks and spills at the earliest possible time with the least amount of spreading, and to exert a major effort in removing visible mercury.

Additional technical decontamination memoranda dealt with operating procedures, particularly for pumps (Ref. 59). Reuse of gaskets was prohibited in the operating areas to reduce leaks in pipe flanges. A procedure (Ref. 60) for replacing amalgam pumps was revised. In the new procedure, the chemical operators were responsible for retrieving any spills resulting from the pump changeout. The operators were to take precautions to ensure minimum mercury spillage. [REDACTED] pumps were not originally equipped with drain valves. On replacing these pumps, the contents were allowed to drain to the floor. It was recommended (Ref. 61) that drain valves be provided on these pumps. Another memorandum noted that avoidable spillage of mercury-laden aqueous solution occurred during replacement of [REDACTED] in aqueous pumps in Building 9201-4. It was recommended that such pumps be replaced as units (Ref. 62). A final memorandum recommended that pumps being removed from service be dismantled prior to repair work so that excess mercury could be removed by means of a vacuum hose or by drainage into a drip pan (Ref. 63).

5.6.6 Three Plant-Scale Experiments

In January 1956, a progress report was given to the Mercury Hazard Committee on three plant-scale experiments conducted by development personnel (Ref. 64). The first was a study of the effect of ambient temperature on mercury vapor concentrations in air by comparing the observed variation with the theoretical expected concentrations in the air. It was concluded that about one-half of the work place air contamination was coming from the floors and walls. A second

experiment examined the effectiveness of sodium thiosulfate (code name HgX) as a mercury vapor suppressant. The idea was to find some substance that would react with the metallic mercury to form a compound having essentially no vapor pressure at ambient temperatures. It was observed that as long as the floor was flooded with a solution of HgX in water, there was a marked drop in the mercury air levels and the levels were significantly lower than with water. To routinely utilize this suppressant, the floors would have to be sealed and all openings curbed. A third study was made to determine the effect of cleaning on mercury air levels. The fourth-floor areas of Cascades 1, 2, 3, and 4 in Building 9201-5 were thoroughly cleaned. Although air contamination increased in some spots during the cleaning, the contamination level dropped below the TLV within 24 h after the cleanup.

5.6.7 The Ventilation Exhaust Study

In March 1956, J. C. Little, Y-12 Engineering Division, issued a report on a survey made in Building 9201-5 during the period between January 26 and February 8, 1956 (Ref. 65), to arrive at a more comprehensive analysis of the mercury losses sustained in the operation of the Building 9201-5 process and to determine the effectiveness of the cleanup program and the ventilation facilities. A series of readings taken at points at which air was exhausted from contaminated areas of the building provided the concentration of mercury in mg/m^3 at those points.

As a result of this survey, Little concluded that mercury losses through the ventilation exhaust system of Building 9201-5 totaled 22.5 lb/d and that the cleanup program had reduced such mercury losses. Since the ventilation exhaust had approximately the same concentration of mercury as that found at breathing zone levels, it was evident that short cycling of fresh air from the air supply system directly to the exhaust facilities was not significant.

5.6.8 Industrial Hygiene Observations of Spill Cleanup

In a January meeting of the Mercury Hazards Committee, the Y-12 Plant Industrial Hygienist made the following observations on the December 31, 1955, spill in Building 9201-5 (Ref. 46): (1) The air concentrations for the first 12 h following the spill were above $2.50 \text{ mg}/\text{m}^3$; during the next 6 h, the concentrations ranged from 1.0 to $2.50 \text{ mg}/\text{m}^3$; after 24 h, they ranged from 0.30 to $1.25 \text{ mg}/\text{m}^3$; after 50 h, the concentrations were down to $0.50 \text{ mg}/\text{m}^3$ or below, and after 75 h, they were back to previous averages for the area involved. (2) Respiratory protective equipment of the proper type was not widely used during the first 12 h following the spill; after that time, however, most of the people in the area already had or were issued the proper type of respirator. It was evident that the massive effort placed on cleanup successfully reduced the airborne mercury vapor concentrations to acceptable levels.

5.6.9 Outside Consultants

Dr. R. Kehoe

Because of his concern over the mercury vapor concentration levels and his interest in finding answers on how to deal with mercury contamination problems, J. P. Murray, Y-12 Plant Manager, told the industrial hygienist to bring in a consultant whose background and experience would qualify him as an expert in the industrial use of mercury and its compounds (Ref. 66).

On February 6 and 7, 1956, Dr. R. Kehoe of the Kettering Institute, University of Cincinnati, visited the Y-12 Plant and discussed the mercury problems. Dr. Kehoe's experience in the caustic cell production of chlorine where mercury is used and his laboratory experimentation and research studies on mercury qualified him as an appropriate consultant.

Dr. Kehoe toured Buildings 9201-4, 9201-5, and 9204-4. He recommended that more extensive cleanup and maintenance efforts be addressed, with emphasis being placed on quick cleanup after spills. He noted that equipment engineered to prevent leakage would be effective in solving the problem. Dr. Kehoe recommended more source ventilation and enclosures and less reliance placed on general dilution ventilation. He did not favor extensive or prolonged use of respiratory protection equipment or the flooding of floors as solutions to the problem. He agreed that the use of respirators was justified in the welding, cutting, and burning of mercury-contaminated equipment.

Dr. Kehoe predicted that if the situation continued for two years without removal of people who showed damage or without rotation of personnel on high-exposure jobs, Y-12 would encounter the same difficulties experienced by the hatters industry with regard to mercury poisoning. Dr. Kehoe indicated that past experience showed that air levels higher than 0.1 mg/m^3 and urine levels of 0.30 mg Hg/L should not be exceeded for prolonged periods since mercury is an accumulative poison. If it were not possible to keep within these levels, he recommended that exposure time be adjusted by the shifting or rotation of personnel to low-level areas based on urine excretion findings (Refs. 48 and 49).

University of Rochester

In February 1956, the Atomic Energy Commission-Oak Ridge Operations (AEC-ORO) requested the Division of Biology and Medicine, AEC-Headquarters, to assist AEC-ORO with the mercury problem in the Colex cascades. Subsequently, Dr. Harold Hodge, University of Rochester, and Dr. Thomas Ealy, Division of Biology and Medicine, AEC-Headquarters, visited the AEC-ORO office for discussion on the mercury problem (Ref. 67).

In April 1956, the Division of Biology and Medicine approved a contract with the University of Rochester to undertake a research program with the following two objectives:

1. To explore the usefulness of more sensitive methods for detecting early evidence of kidney damage such as quantitative determination of urinary proteins.
2. A critical evaluation of the available information on the toxicity of mercury, both in industrial groups and in experimental animals.

Two reports were issued under the subject subcontract. The first objective, cited above, was satisfied by the University of Rochester document (Ref. 68), Chronic Mercury Poisoning: An Evaluation of Our Present Knowledge, by Aser Rothstein. The report indicated that the MAC for chronic mercury exposure of 0.1 mg/m^3 was based primarily on the work of P. A. Neal and his coworkers on exposure in the hat-felting industry. The report indicated that since there was no safety factor in the 0.1 mg/m^3 TLV, it was not a safe level for continuous exposure for long periods of time. The report stated that although the appearance of mercury in the urine was a sign of mercury exposure, it was not necessarily indicative of incipient chronic mercury poisoning. In his studies, Neal (Refs. 17 and 18) found a correlation between the level of exposure by inhalation and the average mercury excretion of a group of personnel. However, intra- and interindividual values showed so much variation that urinary mercury concentrations were not a good measure of mercury exposure for the individual. Furthermore, Neal found no correlation of the urinary mercury levels with signs of mercurialism within a group receiving the same mercury exposure.

According to the Rochester report, removal of exposed personnel from further mercury exposure results in a slow disappearance of symptoms providing the toxicity was not too severe or of long-standing duration. Thus the disease is reversible in the early stages. The second report (Ref. 69) was entitled The Industrial Hygiene and Toxicology of Mercury. Dr. Spiegel reported that many diverse sources give human exposure data for the inhalation of mercury vapor or compounds indicating that for either type of material the choice of 0.1 mg/m^3 is probably a reasonable one. Although tolerance levels ranging from 0.1 to 0.25 mg/m^3 are approved in various national states, the American Standards Association had set 0.1 mg/m^3 as its recommended MAC. An MAC for urine of 0.3 mg Hg/L was suggested.

According to Dr. Spiegel, the most important control measures are the prevention of mercury spillage and minimization of metal accumulation in inaccessible recesses. Control of the source of mercury must include adequate ventilation and, where feasible, local cooling of the operation. In his opinion, general good housekeeping is perhaps the most important control measure.

5.6.10 Other Efforts

In addition to the actions previously described which were taken in the winter of 1955/1956, other actions were taken by Y-12 organizations to effect a reduction in the airborne mercury contamination level (Ref. 70). It was found necessary to keep all areas free of excess equipment and material in order to reduce

potential surface areas for contamination. A hardening floor wax was utilized to seal mercury into the floor after spill cleanup.

Cotton, which would not contaminate as easily and which was found to be much more easily decontaminated by routine laundry washing than Dynel, was adopted for work clothing supplied to personnel.

Every effort was made to eliminate leaks. Valves and flanges that showed persistent leaks were wrapped in plastic and allowed to drain into water-filled buckets. It was determined that walls and equipment should be covered with either a dark green or dark red color, smooth, dull-finish paint that was resistant to the process solutions. Dull-finish paint tended to repel mercury droplets, and small droplets of mercury could be seen best against a dark color.

Since increased temperatures increase the vaporization rate of mercury, all process vessels that were normally operated at high temperatures were insulated. The ventilation studies established that there should be considerable flow of well-diffused air and that care should be exercised to prevent any air stream from being directed toward mercury-contaminated surfaces since increased air velocity increased the vaporization rate. It was established that once the visible mercury was removed from an area the resulting vapor from invisible, finely divided particles could be suppressed by the application of a solution of sodium hypochlorite (Clorox).*

5.6.11 Results

The major objective of the "crash" 1955/1956 program was achieved. Over a two-month period, the average mercury vapor concentration of both Colex buildings was reduced from a point well above the TLV of 0.1 mg/m^3 to safely below this limit by March 1956 (Ref. 70). The mercury vapor average concentration in Building 9201-4 dropped to below 0.05 mg/m^3 in April and remained below this point for over a year. The average for Building 9201-5 remained below the TLV for the remainder of 1956 and dropped below 0.05 mg/m^3 in January 1957. However, it was not always possible to reduce and keep the mercury concentrations below the TLV in all areas. The Y-12 Industrial Hygiene Department did a study that showed the percentages of the mercury vapor samples falling into various concentration ranges (Ref. 71). The data indicated that a continuing effort had to be exerted to maintain a low mercury vapor concentration.

*While this provided a partial solution to the very pressing airborne mercury contamination problem, it resulted in formation of chemical compounds partially soluble in water which concomitantly increased the quantities of mercury discharged into the storm sewer system in a soluble form.

5.7 PROGRAMS TO MONITOR WORK PLACE AND EMPLOYEE HEALTH

5.7.1 The Industrial Hygiene Program

A routine sampling program for mercury vapor in air was initiated in Y-12 in 1949. In 1950, mention was made of use of the General Electric mercury vapor detector and a commercial product for suppressing mercury vapor (HgX). The first information on mercury usage in development programs and on urine sampling for mercury was contained in 1951 reports. By 1952, reports from the Industrial Hygienist showed that more than 6,000 air samples were taken that year and that Y-12 had consulted with Kettering Institute on mercury urinalysis methods.

At the time large-scale use of mercury for lithium separation at Y-12 had developed, methods of air sampling were still being investigated by the Industrial Hygiene group. Only three commercially available methods were found. An instrument operating on the phototube absorption method was found unreliable and difficult to keep in repair. The second method employed the principle of a color change of selenium sulfide-coated paper, which was unreliable because of high sensitivity to temperature and atmospheric condition.

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The third method, the General Electric Instantaneous Mercury Vapor Detector, was found to be reliable. Although it was not a fully portable instrument, it was used successfully in Y-12 during many years of these operations. The General Electric detector operated on 110 V ac, weighed 35 lb, was equipped with neck strap harness and, within the limitations of the power cord, was portable. The harness allowed the operator to use both hands to take samples, make adjustments, and record results. The air was continuously drawn into the instrument by a blower and passed through a detection chamber. In the detection chamber, the 3537^o angstrom wavelength from an ultraviolet light was absorbed by the mercury vapor proportionally to the mercury vapor concentration. Each mercury vapor detector had its own mercury vapor concentration calibration chart from which the vapor concentration could be read. The meter was found to be accurate and sensitive over the range of 0.01 to 1.5 mg/m³. The instrument was calibrated by passing a known flow rate of nitrogen over heated mercury and cooling it with a condenser to get a saturated mercury vapor. With this known flow rate and known saturation concentration of mercury vapor at recorded temperatures, various concentrations could be obtained by mixing known flow rates of uncontaminated nitrogen with this mercury-saturated nitrogen. The mercury vapor detector was calibrated at a variety of concentrations. This calibration was done prior to initial use and on a routine basis thereafter.

A version of the instrument described above had a recording chart and could be used on a continuing basis to record the mercury vapor level at a location over a continuing period of time.

Because of the heavy weight of the General Electric instrument and the difficulty of using it under Y-12 operating conditions with the very long cord required, a great deal of effort was put into developing a smaller cordless instrument. Such an instrument using dc current was

developed and used in the latter parts of the Colex program. It operated on the same principle as the General Electric instrument and was checked and calibrated to ensure the integrity of the results from it.

Subsequently, light, commercially available dc mercury vapor detectors were available. Such instruments were used for mercury sampling until 1976. Since 1976, mercury vapor sampling tubes have been used for air sampling. These tubes contain impregnated, activated charcoal. A known volume of air is drawn through the tube, and the mercury vapor is absorbed in the charcoal. The amount of mercury absorbed is measured with an atomic absorption spectrophotometer, and the results, in units of mg/m³, are calculated. Since 1980, a gold film mercury vapor analyzer has been used as a check instrument, but reported results have been taken with the sampling tubes.

Air sampling was done routinely in development and production facilities. Most of these samples were taken with a portable General Electric instrument and were of the spot type and only represent the concentration at the time the sample was taken. Generally, these were taken in predesignated locations on a scheduled basis. Most of the sampling was done on the day shift, and the averages were perhaps biased high because daytime temperatures were higher, causing more of the mercury to vaporize. Sampling results were reported routinely to concerned supervision on a daily, weekly, and/or monthly basis. These reports frequently included other information and suggestions concerning the high mercury concentrations and how to lower them. A summary of mercury air sample results was reported routinely to AEC in the Y-12 Plant Quarterly Reports.

Special sampling was a common practice. Sources of mercury vapor contamination were frequently found and reported to building supervision or engineers so that changes could be made to reduce air contamination levels.

Another study was done to compare mercury concentrations in the building exhaust system with the average mercury concentrations in the building. This study showed the two concentrations to be essentially the same. This information was used to estimate how much mercury was being exhausted from buildings.

The air results are shown in Figure 5.1 by quarters from 1953 to 1971, along with the number of samples taken. During that period, the Industrial Hygienist reported some special analyses of the data (Ref. 71). Figures 5.2, 5.3, 5.4, and 5.5 are from that report. These figures show the average air sample concentrations and percent of the samples greater than the limit in Buildings 9201-5 and 9201-4 for the period from 1955 through mid-1957. The figures also illustrate the effectiveness of the "crash" cleanup program initiated late in 1955 in the reduction of the air contamination levels.

5.7.2 The Urinalysis Program

In August 1953, W. H. Baumann of the Y-12 Industrial Hygiene section announced that a urinalysis program was being initiated for the

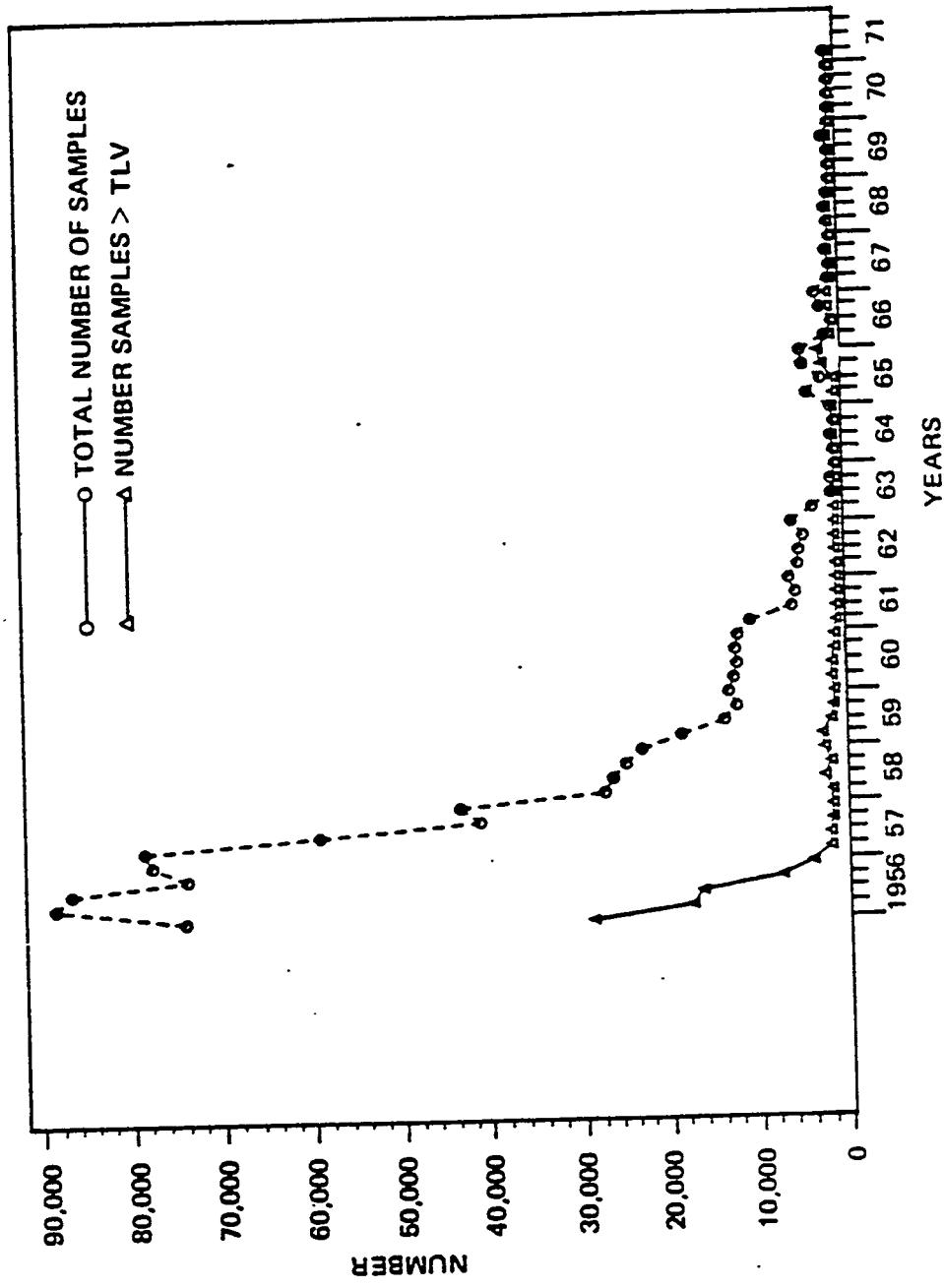


Fig. 5.1. Routine environmental air samples for the Y-12 Plant (plot of the total number of samples taken and the number exceeding the threshold limit value of 0.1 mg Hg/m^3 concentration).

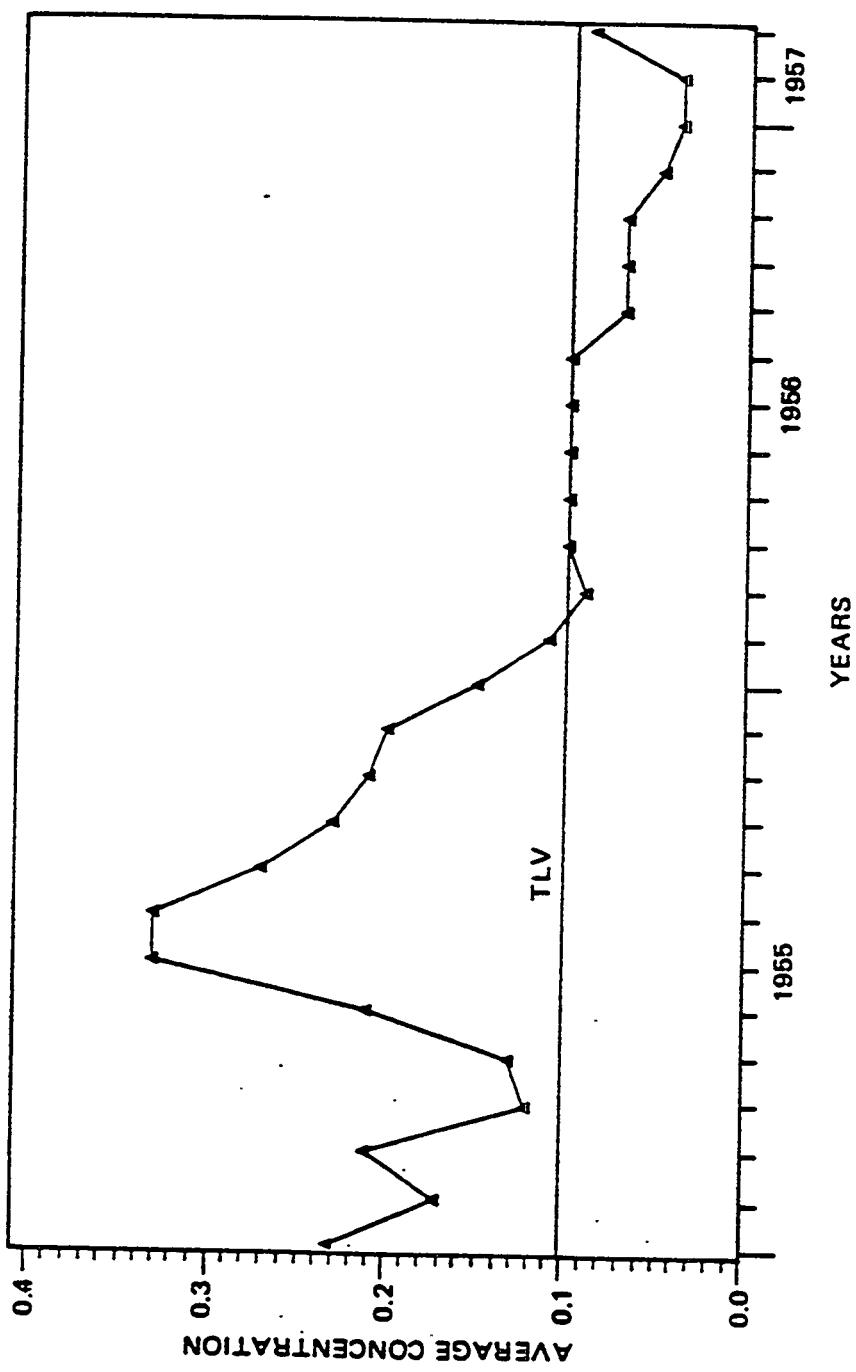


Fig. 5.2. Mercury-in-air concentration (mg Hg/m³) in Building 9201-5
(monthly averages of air samples).

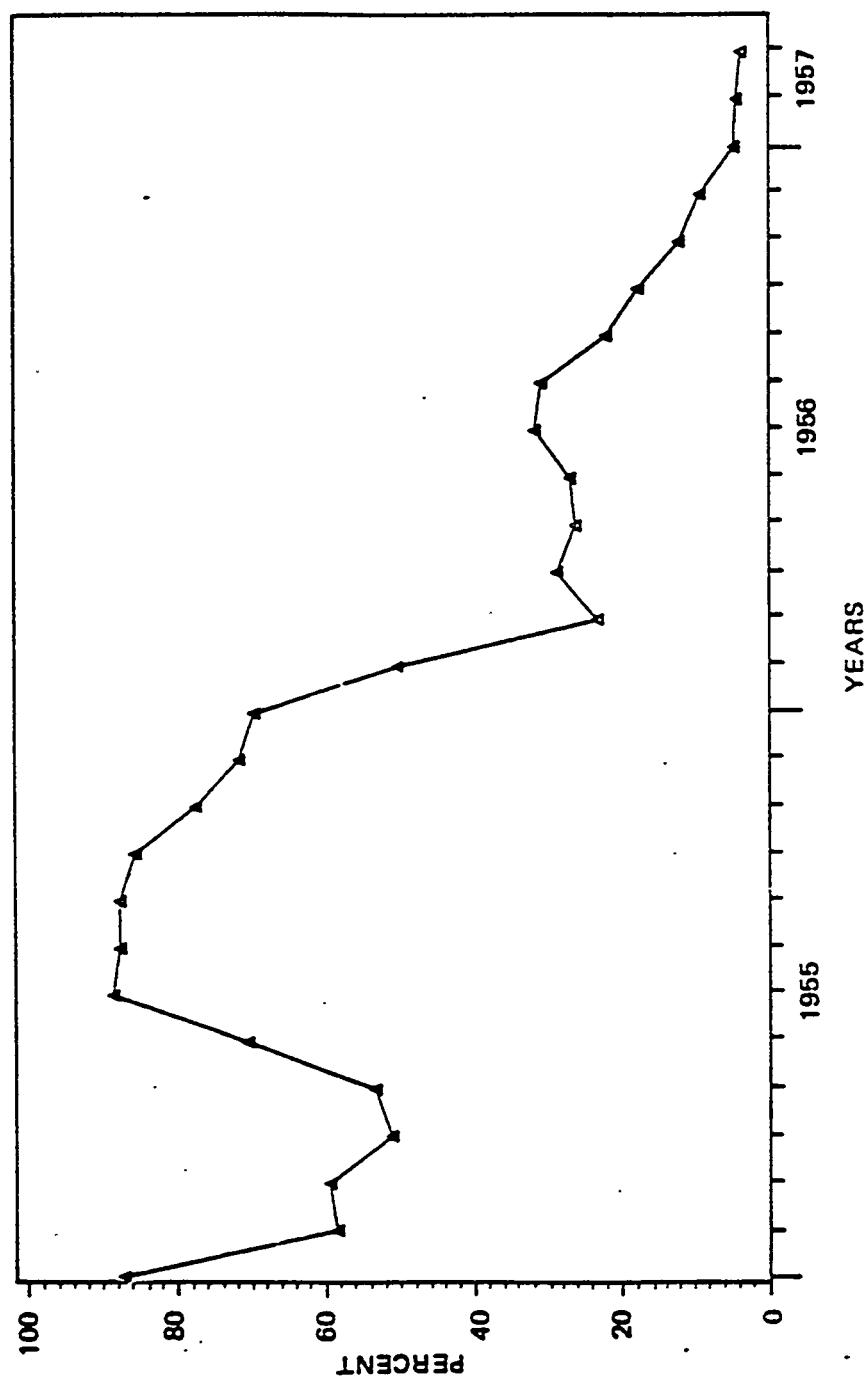
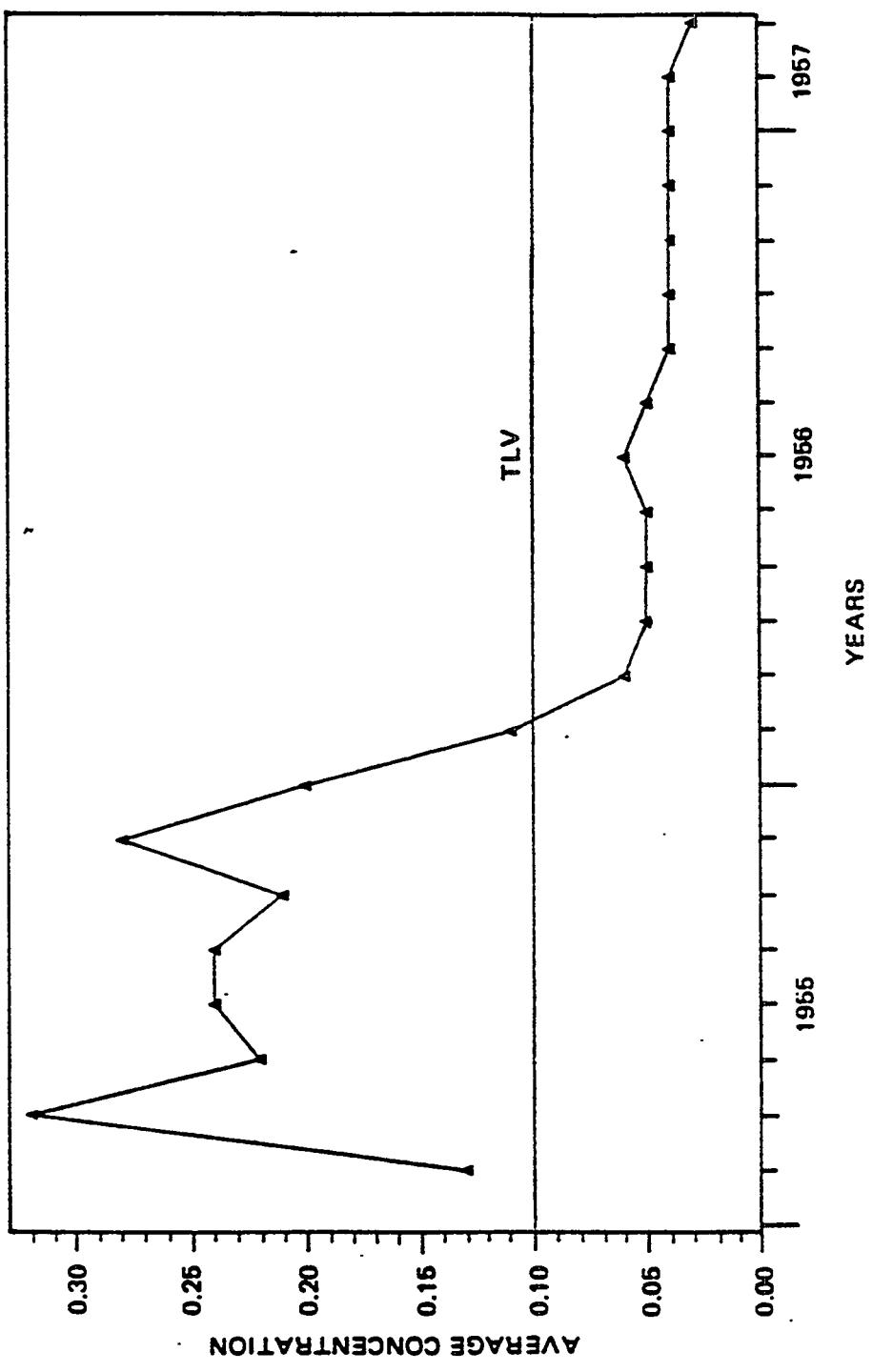


Fig. 5.3. Mercury-in-air concentrations in Building 9201-5 (percent of samples greater than the threshold limit value of 0.1 mg Hg/m^3).



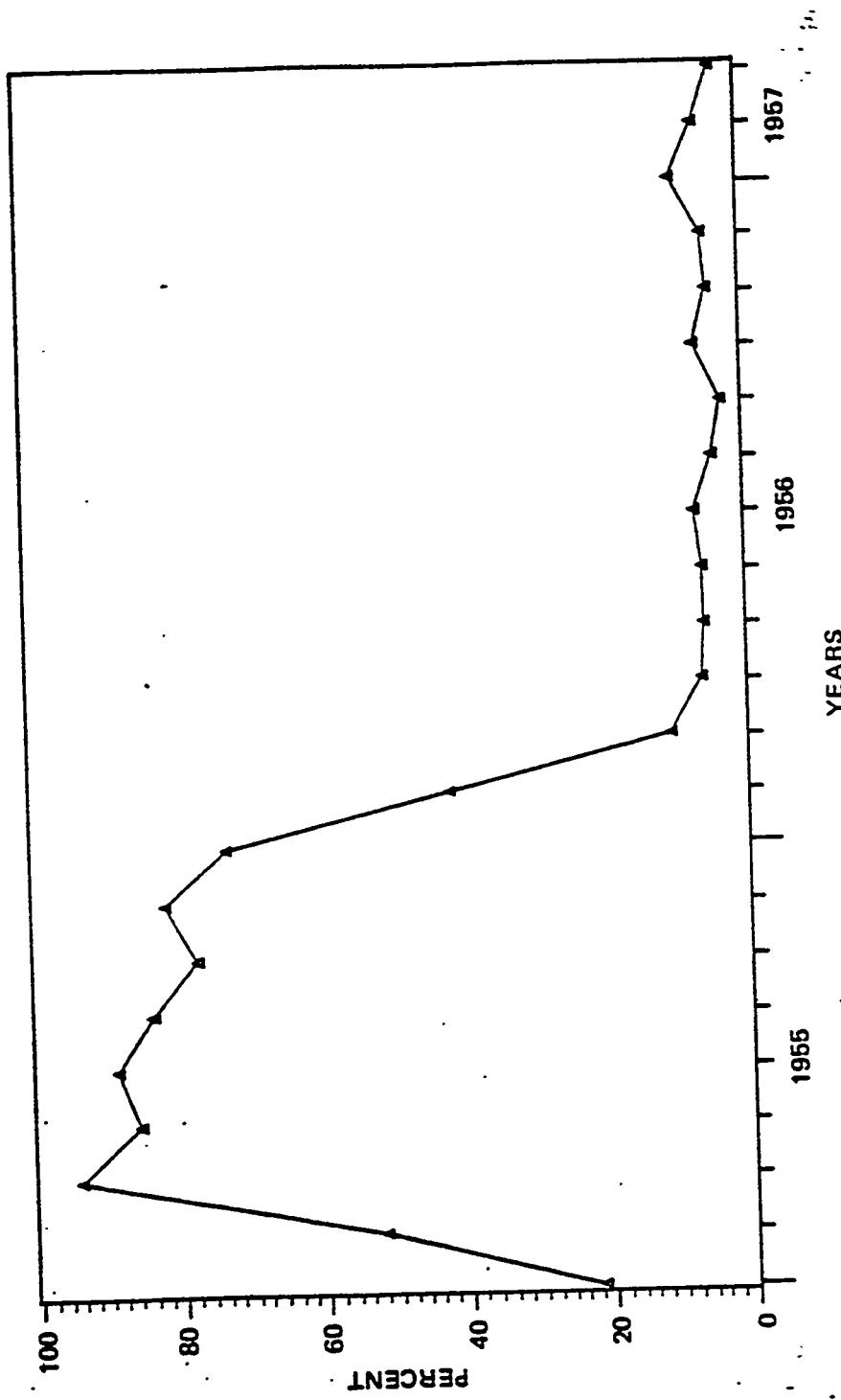


Fig. 6.5. Mercury-in-air concentrations in Building 9201-4 (percent of samples greater than the threshold limit value of 0.1 mg Hg/m³).

Elex plant workers. In his letter (Ref. 72), Baumann indicated that experts in the field of toxicology normally suggest that a statistical representative number of persons be selected from each exposure group (i.e., persons performing duties associated with a given level of contamination). The people selected from each operational grouping were to participate in the program by giving, on a routine basis, large-volume urine samples that were analyzed for mercury. The trend in mercury urine findings for each group was then studied in relationship to the group's exposure level to determine whether additional engineering control was indicated and whether certain persons should be examined more frequently. The Industrial Hygiene section determined the number of people from each group who would participate in the urinalysis program on the basis of the probable degree of exposure. Following a review of the first urinalysis and a study of environmental conditions for mercury contamination, the list was revised to reflect the number of people participating in each group for future urine sampling. The five groups included were based on the following table:

<u>Exposure group</u>	<u>Degree of exposure</u>	<u>Number of employees</u>
Bonnet removal	Medium to high	49
Dispatching office	Very light	12
Maintenance and repair	Medium to high	141
Bonnet repair	Light	20
Office	Very light	6

Maintenance personnel were subsequently added to the program (Ref. 73). During that early period, the procedure called for the employee to give the urine sample at home on a scheduled day off. Because of the elevated mercury vapor and urine levels being recorded, in late 1954 it was decided that everyone working in the mercury process would be included in the urinalysis sampling program. The sampling technique was then changed. Upon returning to the job after scheduled time off, a urinalysis sample was given by the employee before entering the mercury work area or changing into work clothes.

Three methods have been used to analyze urine samples. Originally, a modified dithizone colorimetric method was used (Ref. 74). In 1957, a mercuriometer method was put to use (Refs. 75, 76, 77, and 78). In 1981, the atomic absorption method, which is the method prescribed by the Environmental Protection Agency (EPA) for analyzing water samples, was adopted (Ref. 79). Quality control (QC) programs were run on all of these methods to check the bias and precision of results.

Urinalysis results were reported to supervision periodically. Persons whose results exceeded the PAV of 0.3 mg/L were highlighted in

those reports. People who exceeded 0.6 mg/L were usually restricted from working with mercury until their urinalysis results returned to acceptable levels. Figure 5.6 shows the number of persons who exceeded the PAV of 0.3 mg/L for the period from 1953 through 1971. Figure 5.7 shows the average quarterly urine concentrations for people sampled in these areas between 1953 and 1972. Table 5.3 and Figure 5.8 are from special analyses made by the resident Industrial Hygienist in 1957 (Ref. 71). Table 5.3 shows the percent of the employees working during the 1955 through 1957 period who exceeded the PAV of 0.3 mg/L. Figure 5.8 shows the three-year trends of the average mercury-in-urine concentration levels of three different crafts: outside machinists who worked on pumps, operators who ran the facility, and electricians who worked in Building 9201-5. Table 5.3 and Figure 5.8 show the decline in the mercury-in-urine levels that followed the sharp drop in the mercury vapor levels resulting from the crash cleanup program early in 1956. Figure 5.8 also illustrates that various crafts had different exposure potentials.

Figure 5.9 (Ref. 71) shows the general correlation of the average air results to the average urinalysis results in Building 9201-5 from 1955 through the first quarter of 1957.

Urine excretion studies were made on personnel removed from mercury exposure. Persons who had mercury-in-urine concentration levels greater than 0.60 mg/L were removed from their work assignments, and urinalysis sampling was performed on a frequent basis to determine the time interval necessary for the mercury-in-urine concentration levels to drop below the 0.3 mg/L level. The Industrial Hygienist stated (Ref. 71) that this relationship varied in individual cases and was dependent on the degree and duration of exposure. For personnel exposed for 12 to 15 months to concentrations that were 2 to 7 times the 0.1 mg/m³ standard, the clearing time to reduce the mercury-in-urine concentration level to 0.30 mg/L was 3 to 6 months, and the time required to obtain a level of less than 0.10 mg/L was about 9 to 12 months. Figure 5.10 shows the average data obtained as plotted on a semilog scale. The average time required for the level to drop from 0.6 mg/L to 0.3 mg/L was about 3 months, and the average time required for the level to drop to 0.1 mg/L was about 9 months.

This experience confirms reports in the literature on the elimination of mercury. L. J. Goldwater stated:

The kidneys have a definite capacity to eliminate mercury, so that accumulation takes place only when the absorption rate exceeds this capacity. In man it is considered that for concentrations below 1.0 mg/10 cu. m. of air, elimination is complete; for concentrations greater than 1.0 mg., some Hg is retained temporarily in tissue combinations while, in very high concentrations, for example as high as 10 mg., the characteristics of toxicity and elimination are apt to be quite variable (Ref. 9, 80).

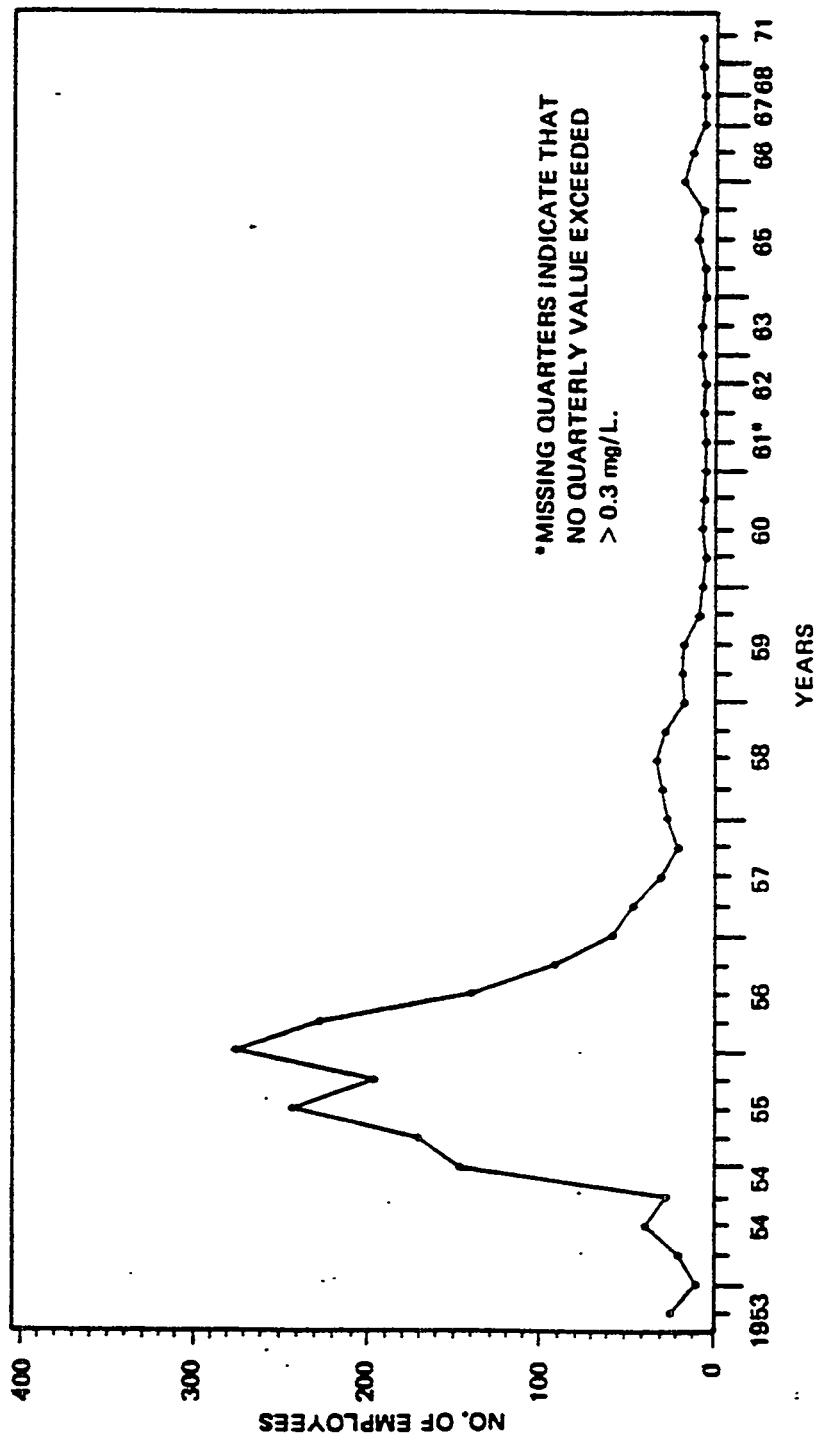


Fig. 5.6. Employees whose quarterly mercury urinalysis levels were equal to or exceeded the plant action value of 0.3 mg Hg/L.

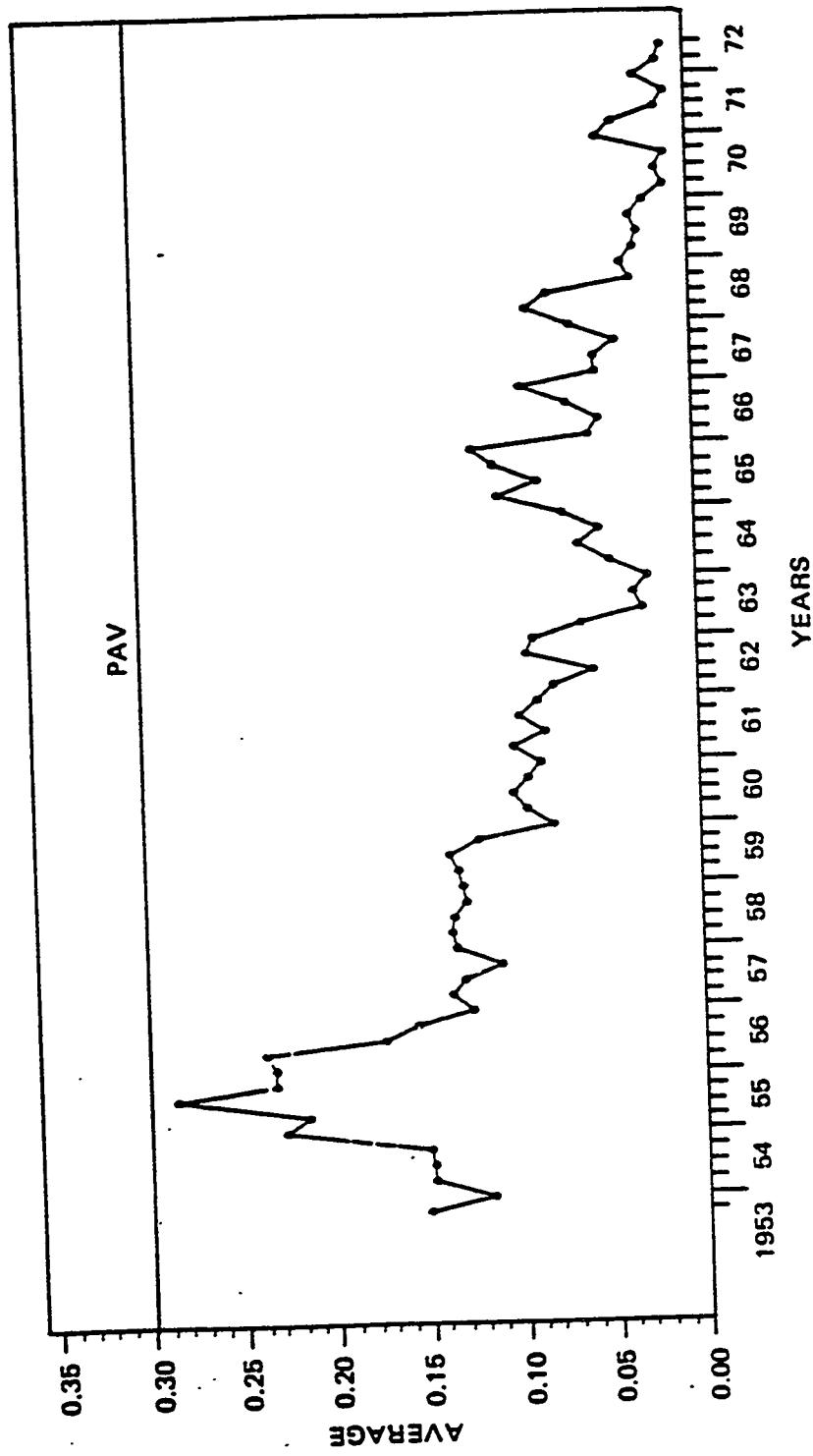


Fig. 5.7. Average of mercury urinalysis in mg Hg/L urine.

Table 5.3. Mercury-in-urine by concentration levels -
1955 through 1957

Year	Quarter	Number of employees	Average categories mg/L			
			< 0.10 (%)	0.10- 0.19 (%)	0.20- 0.29 (%)	> 0.30 (%)
1955	1	565	43.7	20.7	9.9	25.7
	2	764	39.1	25.4	13.4	22.1
	3	767	19.4	31.0	18.0	31.6
	4	799	27.4	27.5	20.7	24.4
1956	1	1,079	32.6	26.5	16.4	24.5
	2	918	29.7	26.1	19.7	24.5
	3	951	40.2	31.0	14.4	14.4
	4	896	47.2	29.2	13.6	10.0
1957	1	903	58.7	26.0	9.1	6.2
	2	743	54.9	29.5	9.7	5.9
	3	734	49.6	35.4	11.2	3.8
	4	729	62.3	29.9	5.3	2.5

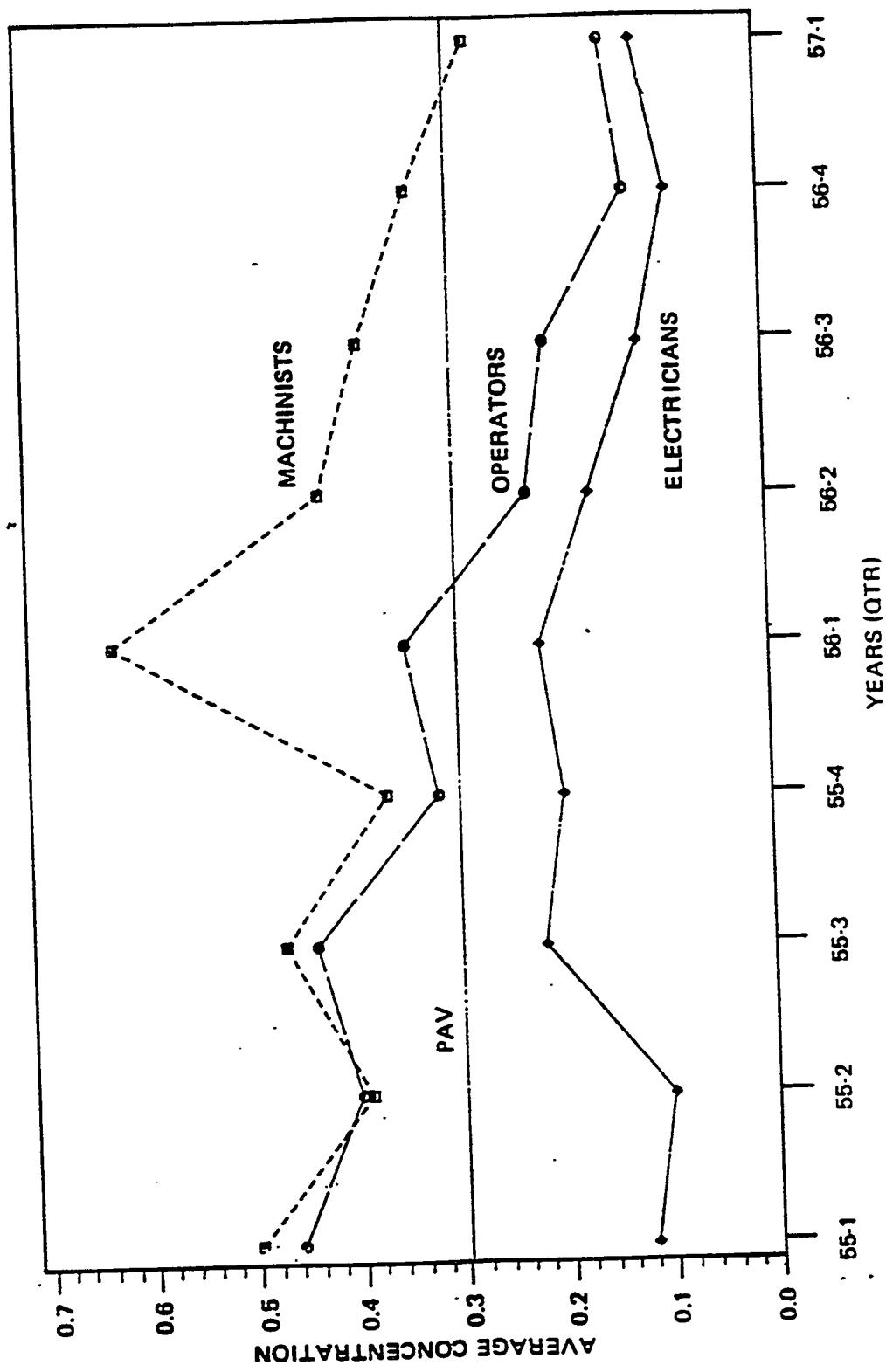


Fig. 5.8. Average mercury-in-urine (mg Hg/L) concentrations for three crafts working in Building 9201-5.

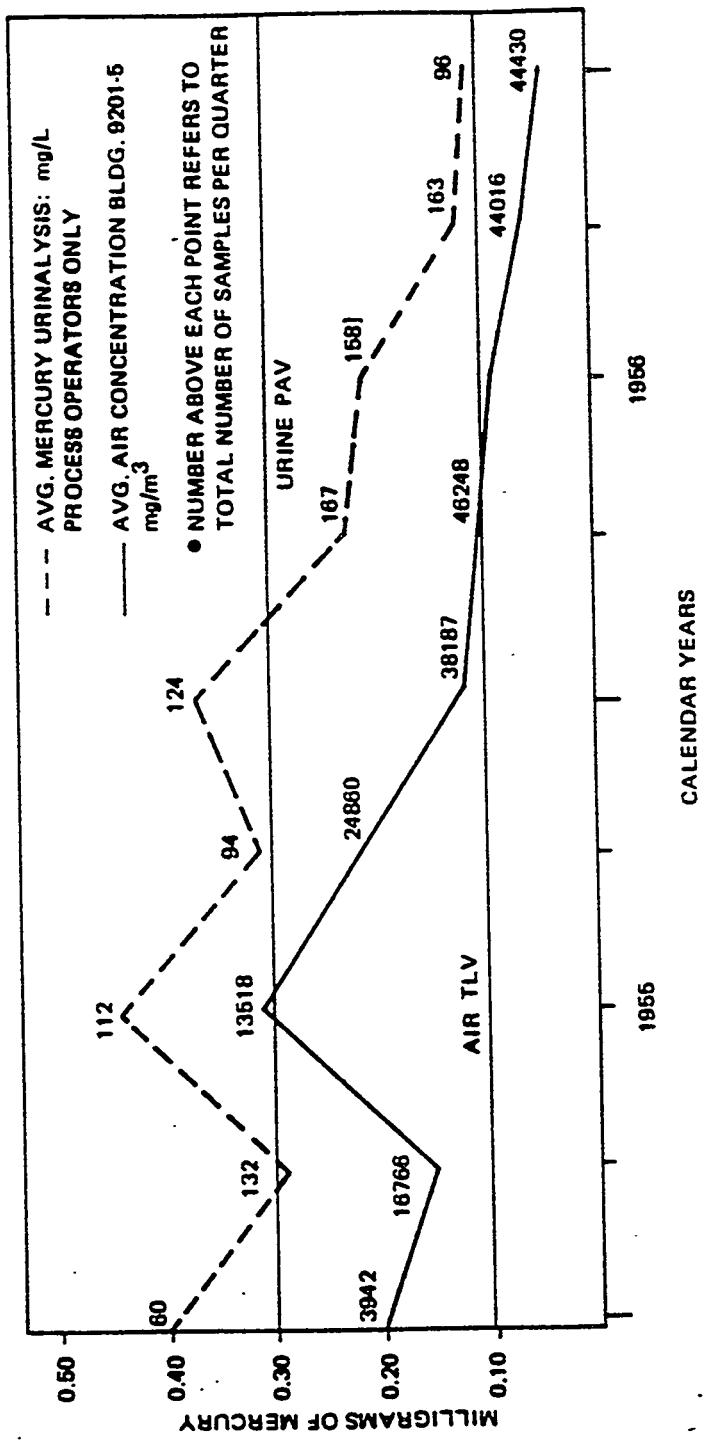


Fig. 6.9. Relationship of mercury vapor concentrations and mercury urinalysis.

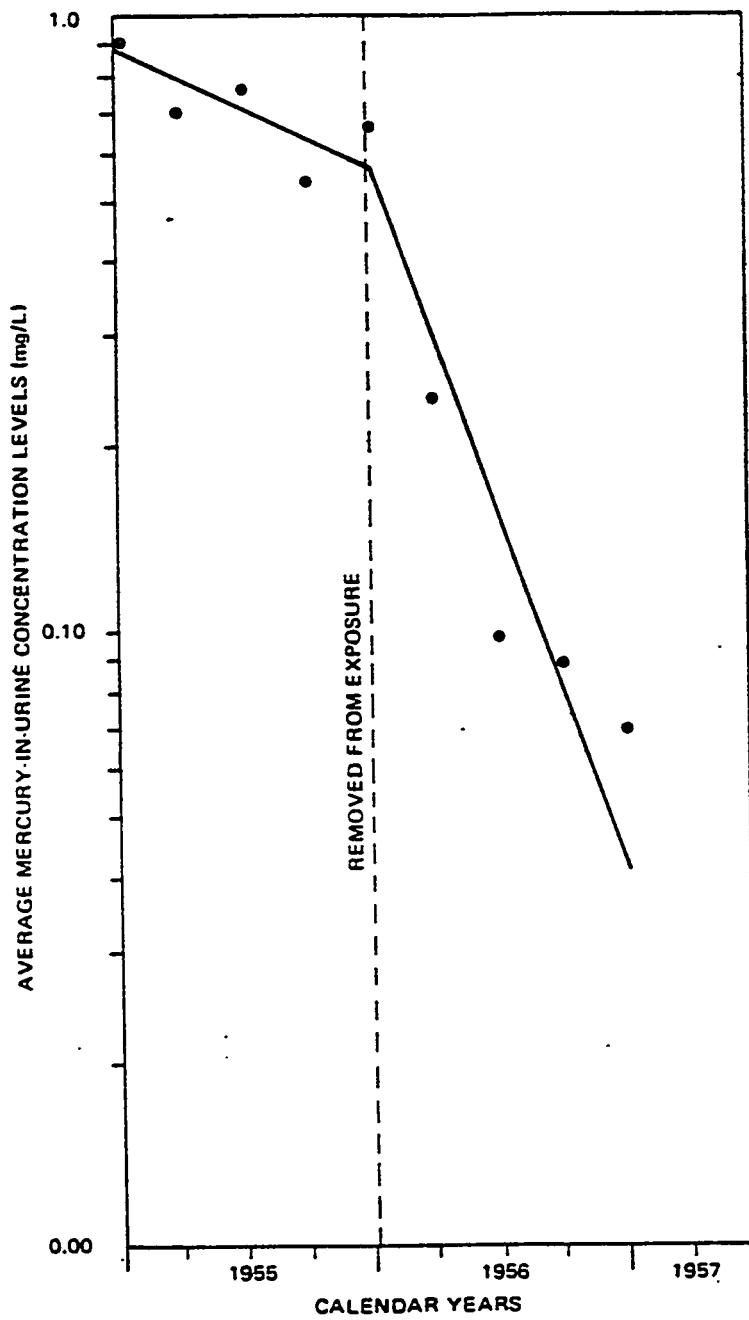


Fig. 5.10. Averages of mercury urinalysis levels for employees removed from mercury exposure.

5.7.3 Physical Examinations

The physical examination consisted of clinical observations for mercury toxicity on every mercury worker every six months. There were inspections of the gums and teeth, reflexes, and central nervous system, along with inquiries concerning symptoms possibly associated with mercury toxicity (Ref. 81).

Individuals with prior history of albuminuria, kidney problems, or hypertension were not allowed to work with mercury. An employee was removed from the Colex program if any albumin was indicated by urinalysis and if it persisted for three consecutive examinations during the week following the initial positive finding. Employees were also removed if they had sufficiently high urinary mercury concentrations. Those removed were returned to work in mercury areas when their urine no longer showed albumin and/or the urinary mercury concentrations became significantly lower than the PAV of 0.3 mg/L.

Approximately 70 employees were restricted for varying periods. At least 12 to 15 of these were returned to the program before the end of the operation. Apparently some workers were found to have spongy gums and dental caries, but no one was removed from the program for these reasons. No tremors or other central nervous system effects attributable to mercury were found.

Relative to the results found, the Y-12 Medical Director stated, "It is known that the kidney can eliminate mercury at low levels for long periods without damage and also that urinary changes may be absent in slow chronic poisoning. It is also known that effects such as spongy gums and transient proteinuria along with vague neurasthenic symptoms can indicate mercury toxicity, but these are often nonspecific and may have nothing to do with mercury exposure." (Ref. 81).

5.8 THE 1974 URINARY MERCURY BIOASSAY STUDY

In July 1973, Dr. Zeb G. Bell, a NIOSH mercury consultant, expressed interest in NICOSH itself examining the mercury exposure data for Y-12 employees. Dr. Bell and his associates were studying a phenomenon called mercurialentis, which is a harmless discoloration of the lens of the eye produced by chronic mercury exposure. In order to determine the applicability of the Y-12 data, Dr. Bell submitted a request through AEC-ORO for a complete printout of all urinary mercury level data in such a manner that urinary excretion fluctuations for different individuals could be established (Ref. 82).

Although AEC and Union Carbide Corporation, Nuclear Division (UCC-ND) personnel recognized that there might be some potential benefit of the proposed study, both organizations were concerned about the problems associated with the dissemination of personal and confidential medical records. Consequently, it was decided that access to Y-12 data should be contingent upon the maintenance of confidentiality. Dr. Bell concurred with the proposal of UCC-ND for ensuring confidentiality, and in December 1974, UCC-ND provided AEC

with computerized mercury bioassay data pertaining to Y-12 employees which covered the period from 1953 through 1966 (Ref. 83).

In a March 1974 letter to James T. Dufour, an AEC-ORO industrial hygienist, Dr. Bell expressed continuing interest in the medical histories and asked for follow-up examinations to be done on 50 of the individuals (Ref. 84). The Y-12 Medical Director provided AEC with the requested data and administered the recommended special diagnostic tests with full documentation of the results, along with an indication of the health status of the tested employees.

Twenty-seven of the fifty people Dr. Bell listed had terminated from Y-12. Therefore, the number of people on the list who were still employed at Y-12 in late 1974 was reduced to 23. Responsibility for the examinations was assigned to Dr. C. C. Patterson of the Y-12 Medical Staff. Dr. Patterson followed a protocol based on the recommendations of Dr. Bell and Dr. H. B. Lovejoy, a physician associated with PPG Industries. In addition to comprehensive histories and physical examinations, the 23 employees evaluated were given multiphasic blood chemistries, urinalysis, complete blood counts, urine mercury level tests, visual field and acuity tests, and slit lamp examinations.

None of the 23 people exposed to mercury showed any chronic effects of mercury exposure (Ref. 85). All had current urine mercury levels below the normal limits of 0.02 mg/L excreted by unexposed persons. All neurological examinations were within normal ranges. None of these individuals had any symptoms or signs of mercurialism, nor did any show any lens changes compatible with mercurialentis.

The mercury urinalysis results of the 27 employees who had terminated were compared to those of the 23 who were given medical examinations. This comparison showed that the two groups had very similar urinalysis histories, indicating their mercury exposures were comparable.

It was noted that five of the persons no longer employed had died while on the Y-12 payroll and that three had been given medical terminations. The Y-12 Medical Department reviewed the medical records of these employees and reported that the records contained no evidence that these employees had any ill effects attributable to mercury during the period of their employment.

Based on this study and the comparable results of the urinalysis, it was deemed unlikely that the 27 terminated employees would have shown any signs of mercurialism had they been given the same special tests and examinations afforded the 23 who were still employed.

5.9 THE ALPHA-4 MERCURY FLASKING OPERATION

In March 1976, UCC-ND was advised that the FY 1976 operations financial plan contained funds for the Y-12 Plant to drain and flask the mercury contained in the equipment in Building 9201-4 for possible transfer to the General Services Administration (GSA) National Stockpile (Ref. 86). In April, Y-12 was requested to prepare and

document a safety analysis of the flasking operation in view of the significant safety, health, and environmental implications associated with handling large quantities of mercury (Ref. 87).

Agreement was reached to perform the flasking operation substantially in accordance with National Stockpile Specification P-31-R2, and new flasks and new pallets were procured in accordance with GSA-approved specifications (Ref. 88).

In November 1976, the Y-12 Plant issued a document entitled, Safety Analysis Report on Mercury Flasking (U) (Ref. 90). The objective of the safety analysis report was to point out and discuss safety-related aspects and considerations pertaining to the flasking operation. Environmental and quality assurance (QA) considerations were also included. This report pointed out that the worst possible incident would probably consist of the unplanned, accidental spilling of the entire contents of a column at one particular time. The chances of this happening were thought to be remote; however, the pits located in both the east and west crane bays were designed to contain the contents of an entire column. Furthermore, the surfaces of these pits were sealed with an epoxy resin coating to prevent any seepage of mercury through porosity or cracks.

The report specified a number of protection procedures to be followed by those working in the flasking operation. Each employee subject to mercury exposure was to be supplied safety shoes and a daily change of company clothing. If the clothing became contaminated with mercury, the employee was required to shower and change clothing. Contaminated clothing and equipment were segregated and stored until a proper disposal method was developed. Personnel required to wear respiratory protective devices were custom-fitted in the respirator testing facility prior to wearing the respirators. Respirators were to be worn anytime the atmospheric concentration of mercury in the work area exceeded the 1976 TLV of 0.05 mg/m^3 . Different types of respirators were used depending upon the mercury concentration in the air.

Building ventilation was operated to maintain mercury concentration below a TWA of 0.05 mg/m^3 . A new exhaust fan and ductwork with a local warning device to warn of ventilation loss were installed to provide exhaust at the existing and the new flasking station. All efforts were exercised to prevent mercury spills in the flasking and transferring operations. When a spill occurred, it was to be cleaned up immediately. Several precautions were stressed to personnel working with mercury. For example, eating and/or smoking in the bottling operation area and the surrounding work areas were strictly forbidden. Personnel working in the area were required to retire to an area that was uncontaminated prior to eating or smoking. In addition, personal hygiene was stressed with personnel being educated in the need for thorough washing of hands prior to eating or smoking. All personnel directly involved in the mercury flasking operation were required to shower daily at the end of the work shift. This requirement was intended to minimize the possible transfer of mercury contamination to personal effects and thereby to the individual's home.

During this operation, the Industrial Hygiene Department conducted three specific monitoring programs:

1. No less than twice daily, technicians under the direction of the Industrial Hygiene group performed a walk-through survey of the flasking operation and monitored the concentration of mercury vapor in the air.
2. Personnel involved in the mercury flasking operation and those persons visiting the area on a regular basis were required to participate in a weekly Mercury Urinalysis Program.
3. Those personnel identified as having a high potential for overexposure to mercury were required to participate in a special urinalysis study designed to detect any effects due possibly to mercury exposure.

In January 1977, Energy Research and Development Administration (ERDA)-ORO completed its operational review of the Building 9201-4 mercury flasking operation and found that the safety provisions contained in the safety analysis report (Ref. 90) and observed at the job site were adequate for safe operation (Ref. 89).

In December 1977, the Y-12 Plant issued an addendum to the safety analysis report on mercury flasking (Ref. 91). This addendum covered the Phase 2 flushing of equipment with water, the treatment of the mercury-contaminated water to remove the mercury prior to discarding, and the cleaning of any mercury butter that was found.

The objective of Addendum 1 was to point out and discuss safety-related aspects and considerations pertaining to the Phase 2 column wash and water treatment and the mercury butter cleaning operations. This report indicated that all the health and safety considerations, personnel protection, industrial hygiene and health physics monitoring programs, environmental statement, and QA items listed in the original safety report were still valid, and the requirements for each were to have been followed.

5.10 ASSESSMENT OF CURRENT SITUATION

5.10.1 Building 9201-4 Office Area Monitoring

In June 1979, Dr. Geno Zanolli, Y-12 Medical Director, invited Dr. Michael D. Utidjan, who at that time was Union Carbide Corporation's Associate Medical Director and Chief Toxicologist, to visit the Y-12 facility and to examine the mercury-in-air environmental levels that had been measured during the months of April and May in the first-floor office area of Building 9201-4. Dr. Utidjan was one of the main authors of the criteria document for mercury issued by NIOSH. The request by Dr. Zanolli was instigated because two employees working in the office area in Building 9201-4 had died from brain tumors, and employees were concerned over their own health.

In a videotaped interview, Dr. Utidjan indicated that the highest level in the office area under discussion was 0.001 mg/m^3 of mercury in air and that the vast majority of samples were well below that. Based on this information, Dr. Utidjan expressed an assurance that there was no mercury health hazard in the 9201-4 offices. He noted that the criteria document for NIOSH recommended a 0.050 mg/m^3 mercury-in-air level as the occupation or work place exposure standard, a level 50 times higher than the level determined in the April and May data. Furthermore, the NIOSH Occupational Exposure Standard is a TWA level to which workers can be exposed on an 8-h to 10-h working day, 40-h work week basis for a full working lifetime without any anticipated adverse health effects. Dr. Utidjan also indicated that it has been estimated that the average American adult takes in about 20 ug of mercury every day, mostly from food and water intake.

In response to the question from Dr. Zanolli concerning cancers or tumors attributed to mercury, Dr. Utidjan pointed out that despite the fact that there is a wealth of toxicological information about mercury, there has never been any evidence in history or more recently in extensive animal toxicology studies that mercury could be carcinogenic. This has been examined closely since it was realized that cadmium, a near relative of mercury in the periodic table, certainly is a carcinogen for some animals and possibly for man.

In conclusion, Dr. Utidjan indicated that, based on the accuracy and validity of the air levels shown to him, he was confident that there was no health risk to people working in that environment, even if they were to be in that environment for 24 h/d. Regarding the concern over brain tumors, he thought that the Y-12 experience did not represent a significant excess despite the preliminary appearances to the layman. On the videotape, he assured the employees at Y-12 that the whole work group of the Nuclear Division was under epidemiological surveillance by the Department of Epidemiology in the Union Carbide corporate office and in the Oak Ridge Associated Universities (ORAU) group headed up by Dr. Lushbaugh.

5.10.2 Preliminary Analysis of Mortality Among Y-12 Mercury Workers Monitored for Mercury (Phase I)

The ORAU is under contract to the DOE to conduct the DOE Health and Mortality Study to determine what effect, if any, working with radiation and radioactive materials has had on workers at DOE facilities. Y-12 Plant personnel have been cooperating with this group as well as its predecessor, the University of Pittsburgh, by supplying available employee exposure data for these studies since the mid-1960s. In 1968, it was realized that mercury exposure to Y-12 employees might be an influencing factor on health and mortality. Consequently, mercury exposure information covering the period from 1953 through 1972 was furnished for these studies.

The recent interest in mercury at Y-12 prompted a request by the 1983 Mercury Task Force to ORAU for an analysis of mortality among Y-12 workers.

The following is an exact quote of Preliminary Analysis of Mortality Among Y-12 Mercury Workers Monitored for Mercury (Phase I), issued by the ORAU Center for Epidemiologic Research and authored by D. L. Cragle, D. R. Hollis, J. R. Qualters, S. A. Fry, and C. C. Lushbaugh.

Introduction

Mercury urinalysis monitoring values are available on computer tape for workers at Y-12 for the years 1953 through 1972. The tape contains 27,516 mercury urinalysis results. These results are from 2,452 individual workers and represent approximately quarterly readings. The 2,452 workers identified from the mercury urinalysis tape, hereafter referred to as monitored workers, can be classified into three groups on the basis of their urinalysis results. The three groups are:

1. monitored workers who never had a positive mercury urinalysis reading
2. monitored workers who had one or more positive urinalysis but who never exceeded the maximum permissible level (MPL) of 0.3 mg Hg/L urine
3. monitored workers who had at least one urinalysis reading that exceeded the MPL for mercury.

The numbers of monitored workers in each group are:

<u>Hg urinalysis reading</u>	<u>Number of workers</u>
0	87
Positive (<0.3 mg/L)	1,474
Positive (>0.3 mg/L)	891
	<u>2,452</u>

[0.3 mg Hg/L urine = maximum permissible level (MPL) at the time of the urinalysis.]

The Current Study

A subset of all Y-12 workers was studied previously in a preliminary mortality analysis. This subset consisted of 6,397 white males who were employed at Y-12 and no other Oak Ridge facility. These workers were employed at least 6 months between 1947 and 1973. The vital status of these workers was determined through the end of 1973 and their mortality experience was compared to the mortality experience of the U.S. white male population adjusted for age and calendar year. This data set was used for examination of the

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mortality experience in the group of workers monitored for mercury because the data are reliable and error-free. A total of 1,482 of the monitored mercury workers was identified in the established Y-12 data subset. The monitored worker group in the current study is comprised of:

<u>Hg urinalysis reading</u>	<u>Number of workers</u>
Negative 0	59
Positive (<0.3 mg/L)	855
Positive (>0.3 mg/L)	<u>568</u>
TOTAL	1,482

Five of these 1,482 workers were monitored for mercury in only one year between 1953 and 1972 and terminated from Y-12 in the year they were monitored. They were lost to follow-up after their termination from the plant. In the current study these five workers did not contribute person-years to the monitored worker group and therefore are excluded from that group. This leaves 1,477 monitored workers to be studied.

Statistics are examined for two groups of Y-12 workers:

1. All persons in the data subset who were never monitored for Hg (N = 4920)
2. All persons in the data subset who were monitored for Hg (N = 1477)

For each group, Standardized Mortality Ratios (SMRs) are calculated for diseases of interest by comparing the observed numbers of deaths to the expected numbers of deaths based on the U.S. white male death rates adjusted by age and calendar year.

Identification of the diseases of interest is based on a review of the literature of the health effects of mercury (Appendix A). The following organs are presumed to be targets for mercury: liver, kidney, lung, and central nervous system. Based on the literature review, there is no experimental nor human data to suggest that mercury is carcinogenic.

Results

The results of the current study indicate that the death rates from all causes of disease taken together are similar among Y-12 workers who were monitored for mercury exposure by

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Table 1

urinalysis, and Y-12 workers who were not so monitored. It Standardized Mortality Ratios (SMRs) for selected causes of death in monitored and non-monitored white male Y-12 workers (U.S. white male death rates adjusted for age and calendar year used as the standard).

<u>Causes of death</u>	<u>Never Monitored</u>		<u>Monitored</u>	
	SMR	OBS	SMR	OBS
All deaths	0.90 (0.81, 0.99)*	405	0.93 (0.79, 1.08)	164
All cancer	1.03 (0.82, 1.27)	84	0.98 (0.67, 1.37)	33
Liver cancer	1.23 (0.14, 4.43)	2	1.59 (0.02, 8.83)	1
Lung cancer	1.12 (0.74, 1.62)	28	1.46 (0.83, 2.37)	16
Kidney cancer	0.46 (0.01, 2.56)	1	3.27 (0.66, 9.55)	3
Brain and central nervous system cancer	2.18 (0.94, 4.30)	8	0.69 (0.01, 3.83)	1
All diseases of the nervous system sense organs	0.66 (0.13, 1.93)	3	0.00 (1.67)**	0
Vascular lesions of the central nervous system	0.84 (0.50, 1.31)	19	0.80 (0.32, 1.64)	7
Respiratory diseases	0.85 (0.50, 1.34)	18	0.46 (0.12, 1.19)	4
Chronic nephritis	0.64 (0.07, 2.30)	2	0.00 (1.09)**	0

* = 95% confidence interval

** = expected number of deaths where observed deaths is zero

OBS = observed number of deaths

SMR = standardized mortality ratio

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is common to find that a working population has a mortality rate for all causes of death combined, that is lower than expected based on U.S. rates, the so-called "healthy worker effect." It is also common to observe in a working population that the SMR for all cancer deaths is higher than the SMR for all causes of death combined; this is because persons with or at risk for certain diseases such as cardiovascular and non-malignant respiratory diseases, are more easily identified and excluded from the work force based on pre-employment or routine physical examination results, than are persons admitted to the work force and who may develop cancer in later years. This pattern is seen in the non-monitored Y-12 workers whose SMR for all causes of death is 0.90 while their SMR for all cancers is 1.03; similarly, the group of workers monitored for mercury has SMRs of 0.93 and 0.98 for deaths from all causes and all cancers respectively.

One death due to liver cancer was observed in the 1,477 workers monitored for mercury. This worker had 15 urinalysis between 1956 and 1959; two urinalysis, both in 1956, exceeded the MAC for mercury of 0.3 mg/L.

Sixteen lung cancer deaths were observed in the 1,477 monitored workers. Based on U.S. death rates, 5 deaths from lung cancer would be expected to occur in the 568 monitored workers who exceeded the 0.3 mg/L MPL for mercury, and 5 lung cancer deaths were observed in this group. Seven lung cancer deaths were expected in the monitored workers who never exceed the MPL for mercury, and 11 were observed. As the non-monitored workers also had an elevated SMR (not statistically significant) for lung cancer deaths, the results suggest that the higher-than-expected, but not statistically significant SMR for lung cancer deaths in the monitored workers probably is related to factors other than mercury, e.g., smoking.

Three deaths due to kidney cancer were observed in the monitored workers compared to the one case that was expected based on adjusted U.S. death rates. One kidney cancer death was a co-op student who was employed intermittently for periods from 2 to 6 months between 1954-1956. This worker had six mercury urinalysis in 1956, two urinalysis were greater than 0.3 mg/L and four were greater than 0.2 mg/L. One other worker had 10 urinalysis; none above 0.3 mg/L. The third worker had only one urinalysis; not above 0.3 mg/L.

Although the elevated SMR (3.27) for kidney cancer deaths in the monitored workers is notable, it is based on <5 cases and

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is not statistically significant (95% confidence intervals: 0.66, 9.55).

One death due to cancer of the brain and central nervous system (CNS) was observed in the 1,477 monitored workers; one death would be expected to occur in this population. This death occurred in a worker whose urinalysis readings never exceeded the 0.3 mg/L MPL. It is notable that eight brain cancers occurred among the 4,920 workers who were never monitored for mercury. The SMR for brain cancers in this group is elevated but it is not statistically significant (SMR = 2.18; 95% C.I. = 0.94, 4.30).

Seven deaths from vascular lesions of the CNS were observed among the monitored workers; this was less than the number expected (SMR = 0.70). However, it is of interest that three of these deaths were observed in the 568 monitored workers whose urinalysis exceeded the 0.3 mg Hg/L MPL at least once; based on U.S. death rates, three deaths from vascular lesions of the CNS would be expected to occur in this sub-group.

Four deaths from non-malignant respiratory diseases occurred in the monitored workers. The deaths were certified as: abscess of the lung (1 death), chronic obstructive lung disease (1), pneumonia (2). All four of these respiratory deaths occurred in workers who had at least one urinalysis that was greater than 0.3 mg/L. This does not represent a greater-than-expected death rate from these diseases in the workers who had readings greater than 0.3 mg/L.

There were no deaths in the monitored workers from chronic nephritis or diseases of the nervous system and sense organs.

Monitored Workers Excluded From the Study

Nine hundred and seventy of the 2,452 monitored workers were excluded from the study because they did not meet certain study criteria. These 970 were characterized as follows:

I. EXCLUDED MONITORED WORKERS WITH READINGS >0.3 mg/L

A. 323 monitored workers who had a reading above 0.3 mg/L

1. 275 worked at other Oak Ridge facilities in addition to Y-12
2. 23 were not white males
3. 2 were employed less than 6 months
4. 23 were excluded due to demographic data errors

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- B. 23 monitored workers with data errors (not in the study)
1. 2 were dead by the end of the study
 - a. Chronic nephritis
 - b. Acute myocardial infarction
 2. 3 died beyond the study cut-off
 - a. Acute myocardial infarction
 - b. Kidney cancer
 - c. Lung cancer
 3. 18 were still alive at the end of 1978

II. EXCLUDED MONITORED WORKERS WITH READINGS <0.3 mg/L

- A. 647 monitored workers who had a reading below 0.3 mg/L
1. 456 worked at other Oak Ridge facilities in addition to Y-12
 2. 114 were not white males
 3. 20 were employed less than 6 months
 4. 57 were excluded due to demographic data errors
- B. 57 monitored workers with data errors (not in the study)
1. 9 were dead by the end of the study
 - a. Alcoholism
 - b. Ill defined and unknown cause
 - c. Lung cancer (2 cases)
 - d. Acute myocardial infarction
 - e. Peptic ulcer
 - f. Chronic ischemic heart disease
 - g. Cancer of pancreas
 - h. Encephalitis
 2. One died beyond the study cut-off
 - a. Acute MI
 3. 47 were still alive at the end of 1978

In the fall of 1983, the analysis file for Y-12 workers will be updated through 1979. At that time, a full analysis of all white male workers monitored for mercury can be done.

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DETAILS ON SELECTED DEATHS IN THE STUDY

Cause of death	Length of employment	Date of death	Age at death	No. of urinalysis	Dates of Mon.	No. >0.3 mg/L
Liver cancer	12/55-05/59	1971	56	15	1956-1959	2
Kidney cancer	01/54-12/56*	1968	32	6	1956	2
Kidney cancer	07/50-10/66	1970	60	10	1958-1960	0
Kidney cancer	09/50-08/56	1970	68	1	1956	0
Abscess of lung	06/54-08/61	1961	57	21	1956	2
Chronic obstructive lung disease	10/55-09/56	1971	69	3	1956	2
Pneumonia	01/55-03/60	1968	55	8	1955-1956	1
Pneumonia	05/53-08/57	1957	39	15	1953-1957	1

*Employment not continuous.

APPENDIX A*
REVIEW OF MERCURY TOXICITY

INTRODUCTION

Mercury occurs in several forms in the environment, and its toxicity varies with these chemical forms. For purposes of discussion, these will be divided into organic mercury, inorganic mercury salts, and elemental mercury. From the standpoint of risk due to occupational or environmental exposure, elemental mercury vapor and short chain alkylmercury (methyl and ethyl mercury) are the forms of interest. These are the more toxic substances when compared to inorganic salts, allylmercurial compounds, and organic salts.¹ In large doses (acute), however, "mercury in any form will denature proteins, inactivate enzymes, and cause severe disruption of any tissue with which it comes in contact in sufficient concentration."²

1. Organic Mercury

"The classification of organic mercury includes methyl-, ethyl-, phenyl-, and the family of alkoxyalkyl mercury diuretics."³ Of these, methyl and ethyl mercury are the common causes of mercury poisonings. Well-documented episodes have occurred in Iraq due to ingestion of grain contaminated with mercury containing fungicides and in

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Minamata and Niigata, Japan, due to industrial contamination of waterways with methyl mercury and subsequent bioaccumulation in fish.

Methyl mercury has a high vapor pressure and is highly lipid soluble. It can be absorbed through the lung, skin, and gastrointestinal tract; ~95% is absorbed during ingestion. Elimination occurs primarily in the feces. Methyl mercury has a half-life of about 70 days.

Within the body, methyl mercury is slowly converted to the Hg^{2+} ion by cleavage of the carbon bond. This ion will accumulate in the kidneys; however, no renal dysfunction has been reported in cases of methyl mercury poisoning.⁴

Because of its lipid solubility, methyl mercury has the ability to pass through the blood-brain barrier and to cross the placenta. The CNS remains the target for methyl mercury with 10% of the body burden being deposited in the brain.⁶ Chronic exposure leads to irreversible brain damage manifested by symptoms that include: (1) early: excitability, depression, fatigue; (2) initial: paraesthesia, tunnel vision, ataxia; (3) intermediate: dysarthria, deafness, ageusia, loss of memory; and (4) final: blindness, stiffened joints, elevated blood sugar, convulsions, coma, death.² In the infant, prenatal exposure may result in cerebral palsy and mental retardation.² A dose-response relationship has been determined for the development of these symptoms.

2. Inorganic Mercury

Inorganic mercury occurs in monovalent and divalent ionic forms, Hg^{2+} and Hg^{1+} . Of these, Hg^{2+} salts (mercuric) are more toxic due to their water solubility and the ability of the Hg^{2+} ion to form complexes with sulfhydryl groups *in vivo*.³ Absorption of the compound may occur by inhalation of dusts or aerosols,⁵ by ingestion (up to 15% has been reported to be absorbed) or by dermal application. Elimination of the substance occurs in both the urine and the feces.⁵ The half-life for Hg^{2+} is ~40 days.

Acute exposure to inorganic mercury (Hg^{2+}) in the form of $HgCl_2$ results in disturbances to both the gastrointestinal tract, due to corrosive action, and to

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the kidney. In the kidney, tubular necrosis occurs leading to oliguria, anuria, and finally uremia and electrolyte imbalance.⁵ The extent of damage depends on dose and time before treatment.

In the case of chronic industrial exposure, the kidney is the primary target organ.³ This results in nephrotic damage and is characterized by proteinurea. Mercury will also be found in the liver, spleen, brain, and other organs.⁵

3. Elemental Mercury

The toxicological significance of elemental mercury is due to its ability to form a vapor. This vapor, which is easily formed at room temperature, is mono-atomic and lipid-soluble; thus, it is readily absorbed through the alveoli upon inhalation. Approximately 80% of the mercury vapor inhaled is absorbed.

Inhalation of large acute doses of elemental mercury vapor results in an influenza-like illness. In extreme instances, the exposure victim may die from acute chemical pneumonitis.⁵

With chronic exposure, elemental mercury absorbed through the lungs is oxidized in the blood to Hg²⁺³. Prior to this oxidation, elemental mercury can overcome the blood-brain barrier and can undergo placental transfer. As with methyl mercury, chronic exposure to elemental mercury vapor primarily affects the central nervous system (though mercury may be found in the kidney, liver, and other organs). The classic symptoms of metallic mercury vapor poisoning include the following: (1) intentional tremor; (2) erethism (used to describe a syndrome including loss of memory, lack of self-control, irritability, excitability, loss of self-confidence, drowsiness, and depression); and (3) gingivitis.² In severe cases, delirium with hallucinations, suicidal melancholia, or manic-depressive psychoses may occur.² Symptoms vary among individuals. Nonspecific symptoms such as shyness and loss of appetite have been shown to occur at exposures of <.1 mg/m³ time-weighted average (TWA) air concentrations.⁶

Elimination of elemental mercury occurs primarily in the urine. (The half-life is ~60 days.) Smith et al.,

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1973, have shown, however, that TWA concentrations of mercury vapor correlate more strongly with symptoms of poisoning than levels in urine. Urinalysis values, which correlated strongly with the TWA, were felt to be indicators of employee exposure but not predictors of development of symptoms.⁶

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5.10.3 Comparison of Chlor-Alkali and Y-12 Plant Mercury Urinalysis Results

In 1970, Smith et al. (Ref. 8) reported on a comprehensive year-long study of mercury exposures at 21 Canadian and American chlor-alkali plants. Three hundred and ninety-five workers gave some 1,000 urine samples that were analyzed for mercury content. Using the data from their report, the urinalysis average for these persons,

usually based on four samples, was tabulated such that a rough comparison of their exposure with that of Y-12 mercury workers could be made. Quarterly mercury urine averages (usually one result) have been tabulated for Y-12 employees. Although the averages were for different periods and, as shown in Table 5.4, are for slightly different ranges, it is believed that these data are generally comparable.

As shown in the table, Y-12 urinary experience after the start-up period compares favorably with the exposure of workers in other industry as reported by Smith. Although the chlor-alkali workers show a higher percentage of results in the lowest range, they also showed a higher percentage of persons with levels greater than 0.3 mg/L, which was the level used at Y-12 as the PAV.

5.11 CONCLUSIONS

The Y-12 Plant had an ongoing industrial hygiene program with a mercury air-monitoring capability before the advent of the lithium separation program. Air sampling with state-of-the-art General Electric mercury vapor detectors was instigated at the start of the lithium isotope separation program. Shortly after the start of the pilot plant phase of the program, a mercury urinalysis program was begun. Experts were consulted on methods of analysis and interpretation of urinalysis data. Early in the program, it was realized that urinalysis data were meaningful, not on an individual basis, but as a method to spot general trends. It was first established on a statistical fraction of the worker population. A 0.3 mg/L PAV (then called MAC) was established. Trends in percent of people above this level and in the average levels were followed in keeping with the meaning of the program. As the pilot program accelerated, air and urine samples were taken more frequently. By the 1952-53 period, thousands of air samples and hundreds of urine samples were being taken each quarter.

The experience in the pilot plants and the Elex production plant was somewhat troublesome from an industrial hygiene standpoint, with a fraction of the air and urine showing levels above the TLV and PAV. However, the problems encountered were considerably less severe than those experienced in the Colex production plants. Tremendous quantities of mercury [REDACTED] were handled each day. These quantities were processed in numerous pieces of equipment located in buildings where the ventilation was not sufficient in the start-up period for the necessary control. Initially, there was no good understanding of the best operational and industrial hygiene techniques. The lithium isotope separation program was operated in an atmosphere of high urgency and resulted in a great number of high air and urinary mercury concentrations during the start-up phase of Buildings 9201-4 and 9201-5. Management recognized the seriousness of the problem, and efforts were made to reduce the concentrations by means such as ventilation upgrading, use of running water and/or chemical vapor suppressant (HgX) over the floors, and greater efforts to keep the mercury spills cleaned up. These efforts began to pay off

Table 3-4. Comparison of mercury urine analysis results in 21 chlor-alkali plants with Y-12 operations*

Facilities	One-year period covered	Persons or person quarters	Ranges ^a and percent in range				
			0 to 0.11	>0.11 to <0.31	>0.31 to <0.61	>0.61 to <1.0	>1.0
Chlor-alkali	Late 1960s	395	60.2%	26.1%	8.3%	4.1%	1.2%
			0 to 0.10	>0.10 to <0.30	>0.30 to <0.60	>0.60 to <1.	>1.0
Y-12	Start-up of Colex second quarter 1955 through first quarter 1956	3,409	29.9%	44.6%	20.7%	4.0%	0.9%
Y-12	After crash program third quarter 1956 through first quarter 1957	3,495	50.0%	40.7%	8.5%	0.7%	0.1%
Y-12	Operation year: 1958	2,509	50.7%	45.1%	4.1%	0.1%	0.0%
Y-12	Building 9201-5 stripping: 1966	322	78.2%	18.9%	2.2%	0.6%	0.0%

^a mg Hg/L.

by mid-1955 (six months after Building 9201-5 was started and two months after Building 9201-4 was started). However, progress was slow through the remainder of the 1955 start-up period, and conditions toward the end of that year were still considered serious. Management then decided that a concerted "crash" effort had to be undertaken to deal with the personnel mercury exposure problem. A great deal of effort went into investigation of problem parameters, leading to a clearer understanding of what had to be done to improve the situation. This understanding prompted continuing administrative and engineered actions to translate the knowledge into fruitful endeavors in three major areas:

1. Spill and leak prevention. Actions were taken to alter or modify equipment to prevent leaks and to implement methods of containing leaks that could not be prevented. Processes and procedures were developed for pump changeout to minimize this major source of small spills.
2. Improved ventilation and temperature control. Air flow was increased and modified to give spot ventilation to sources of mercury vapors and to ensure that there were no unventilated areas. Equipment that ran at high temperatures was insulated.
3. Suppression of vapor. Because most of the vapor was coming from millions of tiny droplets of mercury, efforts were made to: get rid of all unnecessary surface areas; clean up grease and dirt since they retain mercury; treat walls and floors for maximum resistance to the production and retention of mercury droplets; and wash with sodium hypochlorite (Clorox). These actions proved effective.

These and other efforts resulted in a drastic reduction over a three-month period in the number of air samples with mercury concentrations greater than the TLV. The average air and urine levels in both production buildings came under relatively good control although they did require continuing attention to ensure adequate industrial hygiene control during the remainder of the operations. At about the same time the plant mercury-in-air levels were showing a sharp decrease, consultants visited Y-12 and recommended corrective actions that were similar to those already being implemented.

An important question is whether the period of exposure at levels at or above the TLVs caused health damage. Present-day thinking is that there was little margin of safety in the TLV of 0.1 mg/m^3 . In fact, it was lowered to 0.05 in the early 1970s. It is noteworthy that an effort was made to declassify the Y-12 data at the time the NIOSH was preparing its criteria document on mercury. The purpose in mind was to provide the standard setters with useful evidence that it was not necessary to lower the TLV to 0.05 mg/m^3 .

The exposure parameter in the development of mercurialism which is not well specified in the literature is the length of exposure at elevated mercury-in-air levels required to produce adverse health

effect. Reports on damage at the lower levels are for long-term exposures, generally 10 years or so. Although personnel exposure in Y-12, as shown by both air and urine monitoring results, was higher in many cases than established standards and criteria, it is believed that employee health was protected by the following factors: (1) There was a drastic reduction of mercury-in-air levels in early 1956; subsequent air levels generally averaged well below the TLV. This means that for approximately eight of the nine years of the Colex operations, air levels were in control. The drop in air levels was followed by a similar drop in urine levels. (2) The length of exposure was relatively short--the average period of mercury work for the more than 2,000 persons assigned to lithium separation areas was about three years. (3) There was a medical surveillance program for mercury workers; individuals with prior history of albuminuria, kidney problems, or hypertension were not allowed to work with mercury. Periodic six-month physical exams consisted of inspections of gums and teeth, reflexes, and the central nervous system along with inquiries concerning symptoms possibly associated with mercury toxicity. (4) Personnel were removed from mercury exposure if urinalysis indicated sustained high mercury levels or persistent albumin-in-urine results. (5) The fact that mercury is excreted from the body with a "half-life" of from 60 to 90 days and that any early effects of mercurialism are reversible.

Several items illustrate the validity of these factors as related to employee health protection. (1) The Y-12 Medical Director recently reported that there was no evidence of symptoms specific to mercurialism in the charts of mercury workers he had checked. (2) In 1973, a special study was done on 23 persons, selected on the basis of their elevated urinalysis results, were given special sensitive medical examinations to test for late signs of chronic mercurialism. None of the persons examined were found to have any symptoms or signs of mercurialism. (3) A preliminary analysis was made comparing mortalities among white male Y-12 employees who had been monitored by mercury urinalysis to mortalities of Y-12 employees who had not been similarly monitored. This analysis was done by the ORAU as part of its DOE Health and Mortality Studies. The Standard Mortality Ratios (SMR) were calculated for diseases of interest for both groups by comparing the observed number of deaths to the expected number from U.S. white males, adjusted by age and calendar years. Generally speaking, the monitored employees showed a better mortality experience (i.e., a lower SMR) than those who had not been monitored by mercury urinalysis. However, in no cases were the results significantly different.

In summary, there were no significant signs of chronic mercurialism during the time of the operations, nor have the studies made since shown any long-term effect from these mercury exposures.

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**6. THE ENVIRONMENTAL IMPACTS OF MERCURY
RELEASES AND LOSSES**

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6. THE ENVIRONMENTAL IMPACTS OF MERCURY RELEASES AND LOSSES

In the following review of the studies concerning the environmental impacts of mercury releases and losses at Y-12, it should be kept in mind that data have been collected over 30 or more years. During that time, many things have changed, including: (1) the scientific and public perception of mercury as an environmental hazard, (2) mercury standards and criteria, and (3) analytical sensitivity.

The human health factor and certain botanical hazards of mercury vapor were recognized prior to the first large-scale use of mercury at Y-12. As demonstrated in the previous section, Y-12 reacted responsibly to the need for ensuring worker health in the presence of vaporous mercury. In contrast, the environmental consequences of aquatic discharges of inorganic mercury were not recognized by the scientific community until several years after the production use of mercury at Y-12 had ceased. Remarkably, during the period of its production use (1950-1963), Y-12 monitored aquatic discharges of mercury, and this monitoring has continued.

Environmental standards and criteria tend to evolve as new information becomes available. For mercury it is significant that the work place air standard, American Conference of Governmental Industrial Hygienists (ACGIH) has become more stringent (0.1 to 0.05 mg/m³) in the past 30 years, whereas the criterion [Food and Drug Administration (FDA)] for mercury in edible fish flesh has become less stringent (0.5 to 1.0 ug/g). With the exception of the work place air standard, all standards and criteria for mercury are of recent vintage, having been first promulgated in the early- to mid-1970s.

In order to establish and enforce environmental standards and criteria, analytical methods that are sufficiently sensitive and reproducible must first be developed. As with many contaminants introduced into the environment, natural background levels of mercury could not be quantified until sufficiently sensitive methods of analysis were available. For mercury, this analytical threshold was not passed until the late 1960s when the cold vapor atomic absorption method was demonstrated. Prior to this time, detection limits were far above levels now recognized as natural background.

Although the above changes are the most important, two other related changes are also relevant to consider. The first pertains to the growing awareness of the interdependence of living systems (i.e., their ecology). The Silent Spring, written by Rachel Carson and published in 1962, was the first public manifestation of ecological awareness. As detailed later in this section, the interdependence of living systems was demonstrated again in the late 1960s when biological methylation of inorganic mercury was discovered. The methylation of mercury by bacteria, followed by uptake and accumulation in aquatic organisms, was not expected, and its publicity in 1970 sent shock waves through the scientific and regulatory communities in Europe, Japan, and North America.

The wave of ecological studies that began in the mid-1960s has led to more sophisticated methods of ecological study and a considerable depth of understanding of many natural processes. As natural processes and their interrelationships have become better understood, vastly improved methods of further study have been identified and implemented. For example, it was learned in the early 1970s that fish size (weight) and mercury concentration in fish flesh are highly correlated because of the long half-life of mercury in fish (the rate of uptake greatly exceeds the rate of elimination). Thus comparisons among individual fish or among populations from different areas must consider the effect of fish size. A similar situation was discovered for sediments in which mercury concentrations are highly and inversely correlated with the average particle size of sediments (i.e., fine-grained sediments within a given area will have higher mercury concentrations than coarse-grained sediments). Thus in spatial and temporal comparisons of mercury in sediments, the effect of particle size must be considered.

These introductory comments are intended to provide an overview of the general evolution of the philosophy and actions concerning mercury in the environment. In a specific examination of the record at the Y-12 Plant over the past 30 years, it can be concluded that, with few exceptions, past studies of mercury were conceived and executed in accordance with the contemporary thought and methodology.

6.1 DESCRIPTION OF AREA IMPACTED

6.1.1 Topography and Stream Flow

Oak Ridge is located in Roane and Anderson Counties in East Tennessee. The whole area, including the city and the Department of Energy (DOE) plants, is referred to as the reservation (Ref. 1). The reservation is in the Valley and Ridge Physiographic Province of the Appalachian Mountains which is 13 to 20 km wide and extends ~2,000 km from the Canadian St. Lawrence lowland to Alabama. The Valley and Ridge Province is a complex transitional zone bounded by the Appalachian Plateau Province to the west and the Blue Ridge Province to the east. This transitional zone is characterized by a succession of southwest trending ridges and valleys that are the result of the underlying geologic structures that were developed by extensive compressional forces. Structures include major thrust faults and synclinal and anticlinal folds. Ridges and valleys are the result of differential erosion (Ref. 2).

The Clinch River, originating in Virginia, is a tributary to the Tennessee River and winds along the eastern, southern, and western periphery of the reservation. Tributaries into the Clinch River on the Oak Ridge reservation include Melton Branch Creek, White Oak Creek, and Poplar Creek.

East Fork Poplar Creek is a tributary to Poplar Creek, and Bear Creek is a tributary to East Fork Poplar Creek. The Y-12 Plant is at the headwaters of East Fork Poplar Creek, which proceeds northward into the city of Oak Ridge then westward through the city of Oak Ridge,

where it joins Poplar Creek near the Oak Ridge Gaseous Diffusion Plant (ORGDP). Figure 6.1 is a detailed map of the stream drainage in the Oak Ridge area and also shows the locations of the major ridges. Figure 6.2 shows the location of Bear Creek and East Fork Poplar Creek in relation to the three facilities [Y-12, ORGDP, and Oak Ridge National Laboratory (ORNL)].

East Fork Poplar Creek has a drainage area of 29.8 sq miles and receives between 5,400 and 10,800 gal/min of waste water from the Y-12 Plant and 1,350 to 4,500 gal/min of effluent from the sewage treatment plant of the city of Oak Ridge. The average flow of East Fork Poplar Creek is 21,700 gal/min ranging from a maximum of 1.17×10^6 gal/min to a minimum of 5,900 gal/min (Ref. 3). The state of Tennessee stream use classification for East Fork Poplar Creek starting from the mouth of Poplar Creek to Creek Mile 4.8 is fish and aquatic life, recreation, irrigation, and livestock watering and wildlife. East Fork Poplar Creek from Creek Mile 4.8 to 8.3 is fish and aquatic life, irrigation, and livestock watering and wildlife. East Fork Poplar Creek from Creek Mile 8.3 to the discharge at New Hope Pond is fish and aquatic life, recreation, irrigation, and livestock watering and wildlife (Ref. 4).

Bear Creek headwaters are at the west end of the Y-12 Plant. Bear Creek proceeds westward until it enters East Fork Poplar Creek near ORGDP. The upper part of Bear Creek basin is used by the Y-12 Plant for waste disposal and lies within the Oak Ridge reservation. The discharge of Bear Creek near its confluence ranges between a 160-gal/min minimum and a 226,300-gal/min maximum (Ref. 3). During the summer, the upper channel of Bear Creek frequently dries up. The Tennessee stream classification for Bear Creek from its headwaters to its mouth is fish and aquatic life, recreation, irrigation, and livestock watering and wildlife (Ref. 4). Bear Creek lies entirely within the Oak Ridge reservation. There is no privately owned or occupied land along Bear Creek.

6.1.2 Geology

The Y-12 Plant is located in a valley bounded by Pine Ridge to the north and Chestnut Ridge to the south. The underlying bedrock consists of Middle Cambrian age Conasauga Group (see Fig. 6.3). The Roane Formation, which is a sequence of sandy shale and shaley sandstone, forms the ridge to the north; and the Knox Group, which is generally thick-bedded siliceous dolomite near the plant, forms the ridge to the south. The shale of the Conasauga ranges from clay to silty shale and contains alternating beds of light grey, dense to crystalline, regularly bedded limestone. Toward the south side of the plant, the Conasauga consists of about 91 m of massive, light-to-medium-grey, densely to coarsely crystalline and oolitic limestone. In various soil and rock borings within the plant, clay-filled solution channels of varying dimensions have been encountered.

The strike of the beds averages about N 55° E. and dip about 45° to the southeast in the plant area. There are no major outcrops in the plant except at the headwaters of East Fork Poplar Creek. Borings indicated that there are two major systems of joints, one with a strike

1.44×10^3 mm/d

of N 55° E with a dip of 45° to the northwest and another with a strike of N 35° W with a dip of 35° to the northeast. Spacing of these joints in the cores varies from a few inches to as much as 20 ft (Ref. 5).

Based on groundwater investigations carried out to the west of the plant in Bear Creek disposal area in 1981, groundwater flow in the plant is expected to have generally followed surface topography prior to site construction. In general, groundwater is still expected to flow in a southwestward direction toward the East Fork Poplar Creek, deviating along fractures and channels.

Original topography, available on preconstruction topographic maps, indicates much topography modification. The soil borings indicated up to 10 ft of fill over preexisting topography. Fill is generally logged as crushed limestone, shale, and clay (Ref. 6).

6.1.3 Buildings and Facilities Involved

Figure 6.4 shows a diagram of the location of the buildings and facilities used at Y-12 in the lithium isotope separation program and their relationship to the East Fork Poplar Creek.

The pilot plants for the Orex, Elex, and Colex processes were located in the Laboratory Buildings 9733-1, 9733-2, and 9202 and in the 9201-2 production building toward the east end of Y-12. The big production facilities were at the western end of the Y-12 Plant in 9204-4 (Elex production) and 9201-4 and 9201-5 (Colex production). The 9720-26 facility at the western end of Y-12 is the mercury storage warehouse. The 81-10 mercury recovery area site is shown south of the drainage ditch. The diagram shows the drain lines from the various buildings to the creek as they exist today.

More complete descriptions of the buildings and facilities are contained in Sections 1.3, 1.4, and 1.5 of this document.

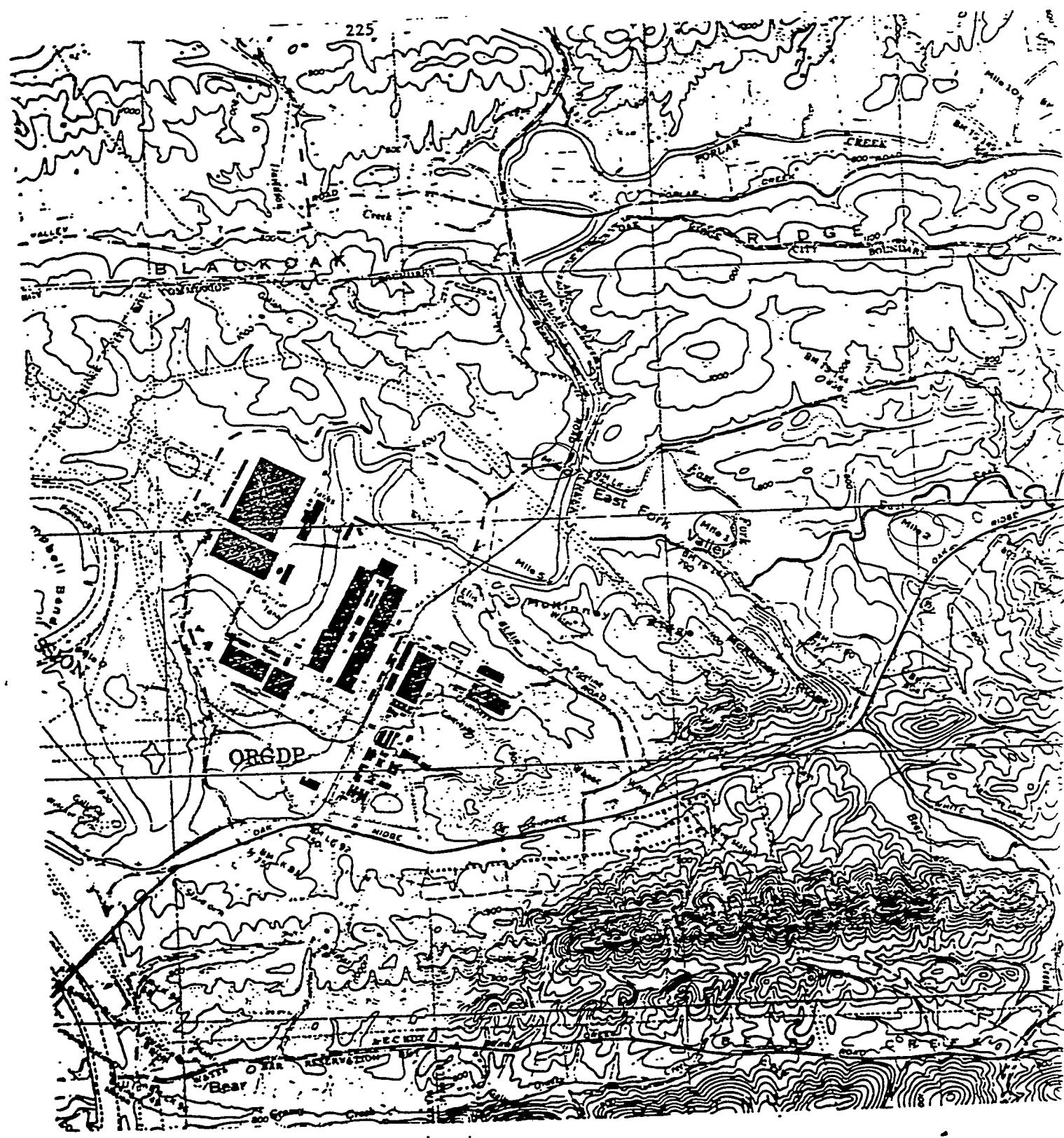
6.2 PROCESS DESIGN AND OTHER OPERATIONS FEATURES THAT Affected THE ENVIRONMENT

6.2.1 Design Features Affecting Environmental Quality

In an effort to maintain mercury vapor concentrations in the air at acceptable levels in the Colex production buildings, a series of high-speed exhaust fans were used to provide a ventilation rate of about 2,836,000 ft³/min. The subject is discussed in detail in Section 4.1 of this document.

6.2.2 Design Features Protecting Environmental Quality

In the Colex production buildings, 9201-4 and 9201-5, the process areas were designed to contain and collect process leaks and spills in the floor drain system that fed into a series of two collection tanks inside each process building. The water liquid overflow from the first collection tank fed a second collection tank, in series. Mercury collected in the bottom of these tanks was routinely removed.



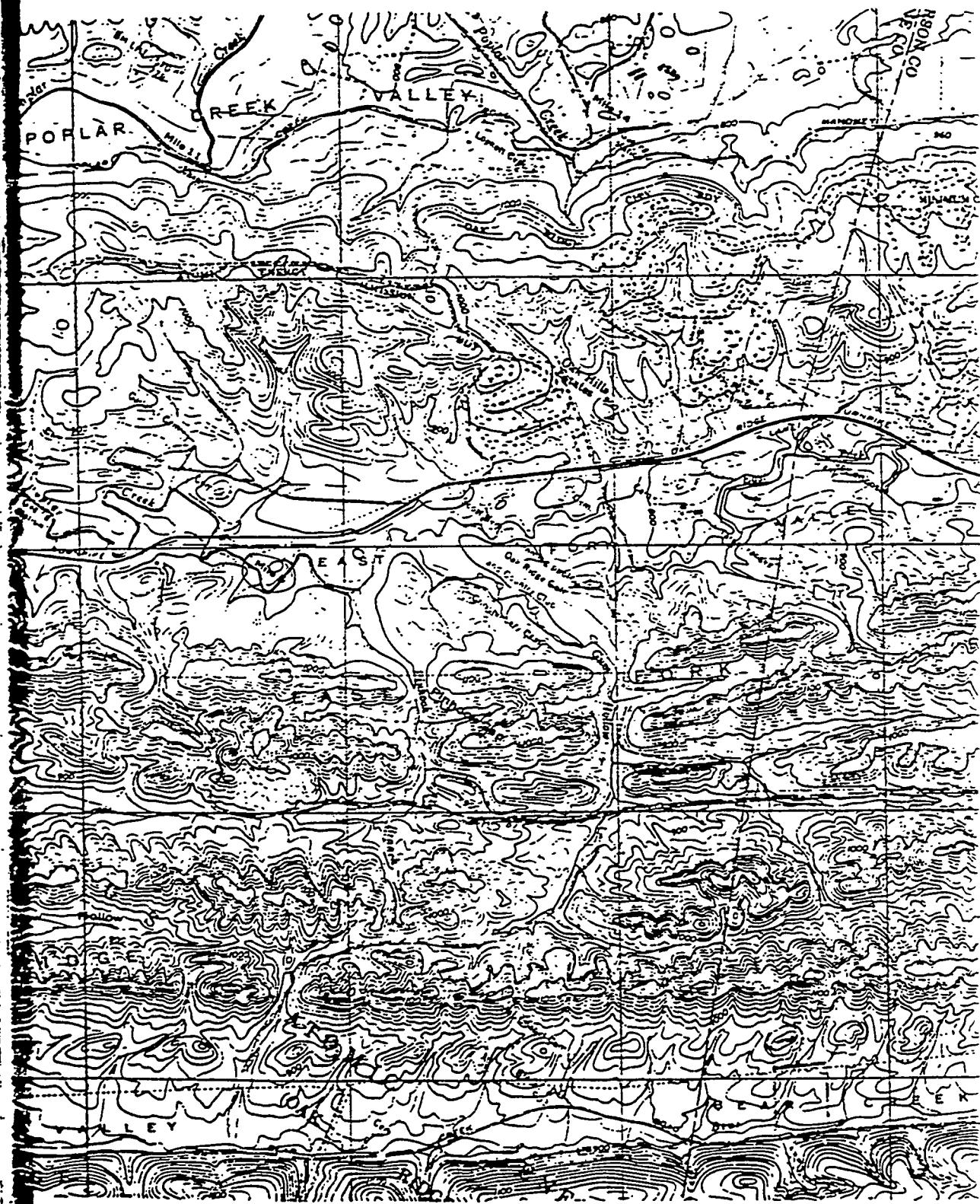
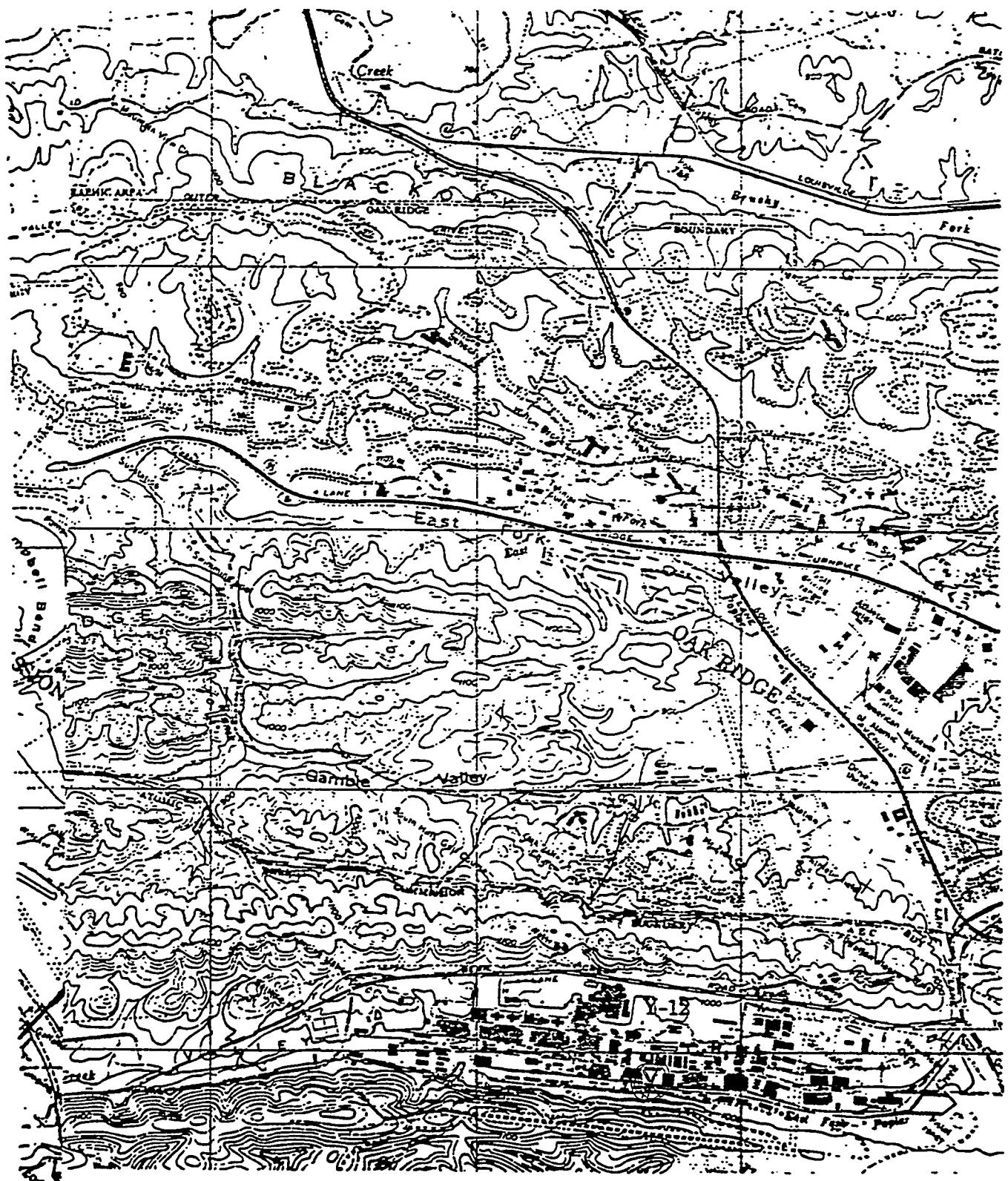


Fig. 6.1. Detailed stream drainage in the Oak Ridge area.



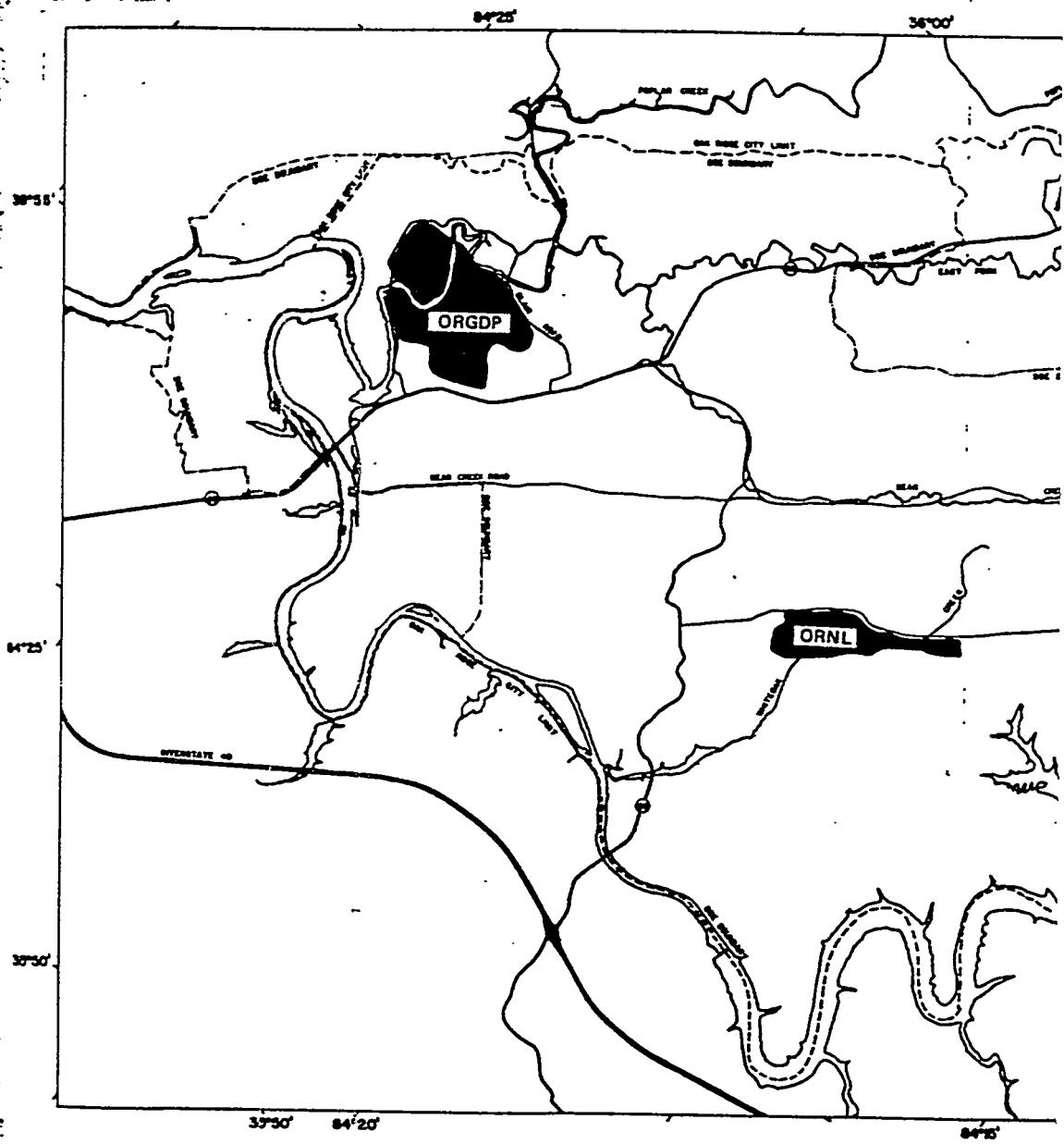
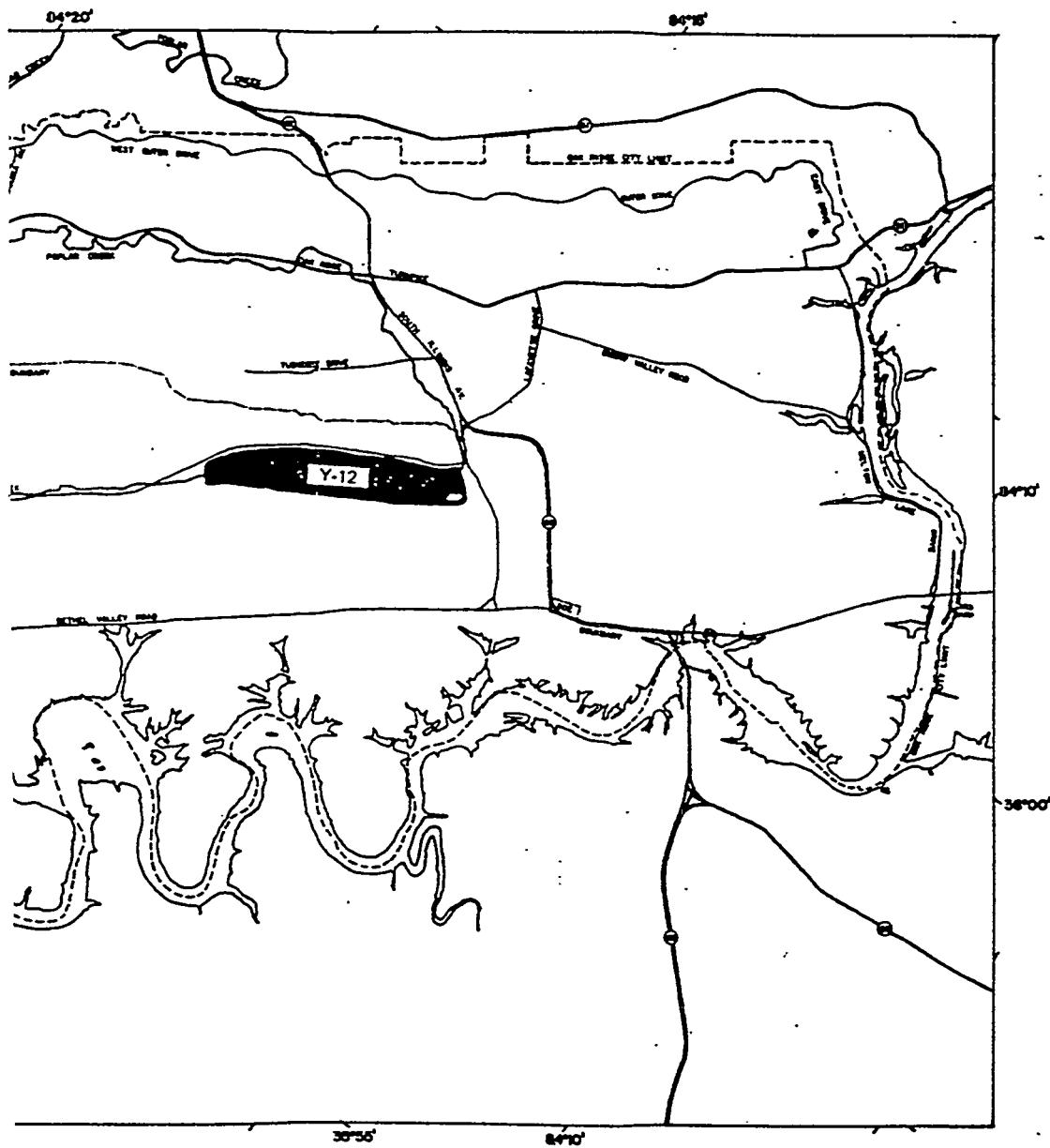
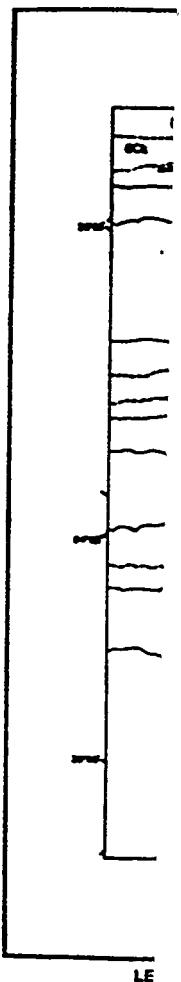


Fig. 6.2. Location of Bear Creek relative to the three plants (Y-12, ORGDP, and ORNL).



Creek and East Fork Poplar Creek in relation
to ORNL).



ERA				
PALEOZOIC	R	P	R	M

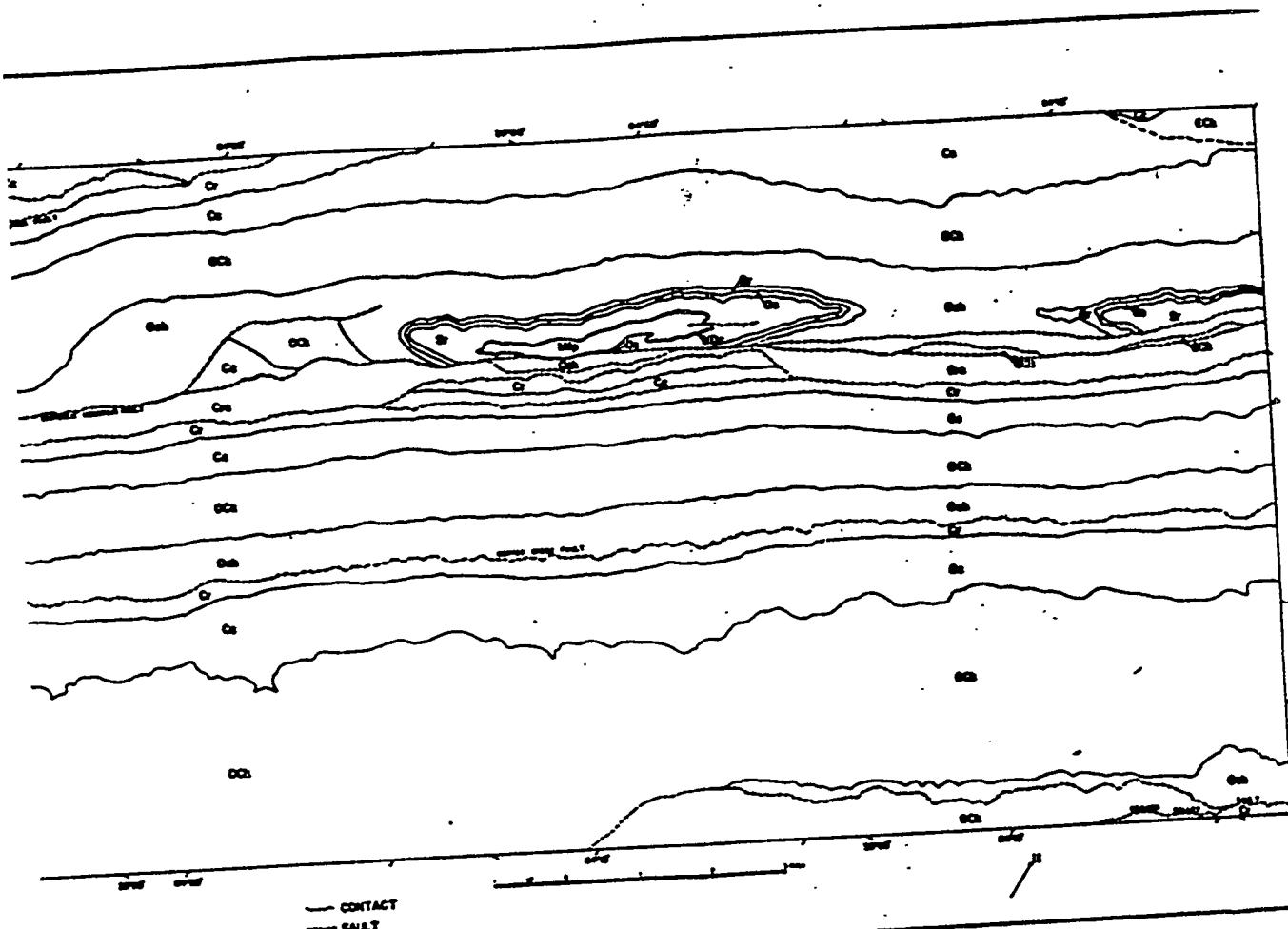


Fig. 6.3. Geologic map of the Oak Ridge area.

GEND

SYSTEM	SERIES	GEOLOGIC MEMBER	MAP CODE
MISSISSIPPIAN	LOWER MISSISSIPPIAN	FORT PAYNE CHEM	MPC
DEVONIAN	UPPER DEVONIAN	CHATTANOOGA SHALE MAURY FORMATION	MDC
SILURIAN	LOWER SILURIAN	ROCKWOOD FORMATION	SR
ORDOVICIAN	UPPER ORDOVICIAN	SEQUATCHIE FORMATION	OS
	MIDDLE ORDOVICIAN	REEDSVILLE SHALE	OR
	LOWER ORDOVICIAN	CHICKAMAUGA LIMESTONE	OCL
	KNOX GROUP		OKG

B4

AS

AH

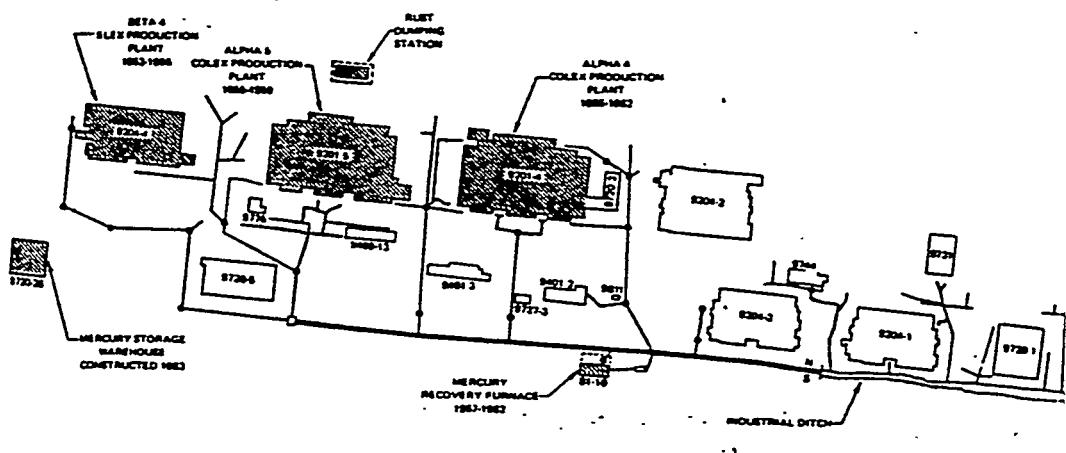
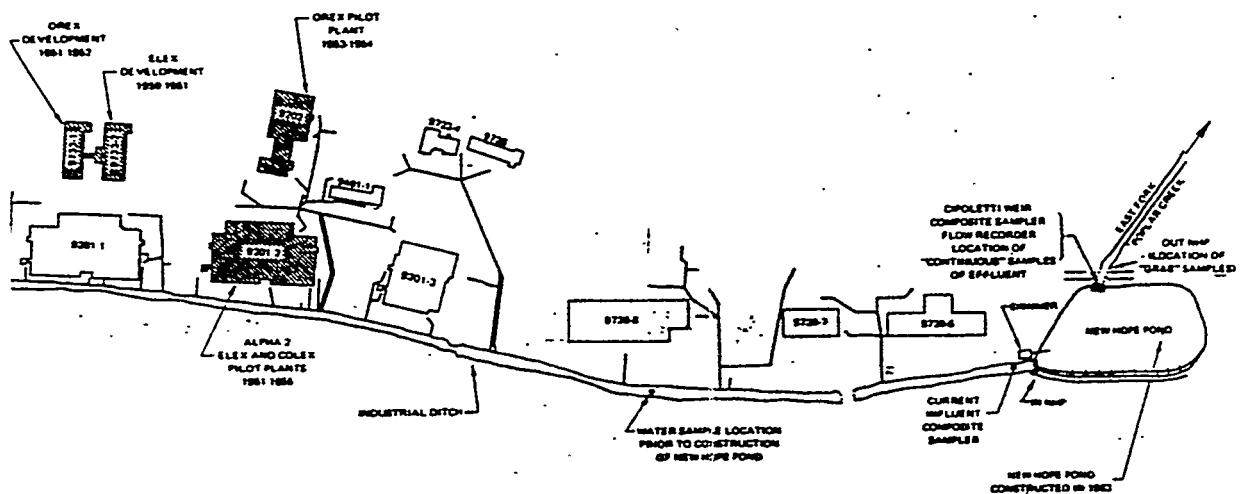


Fig. 8.4. Lithium isotopes

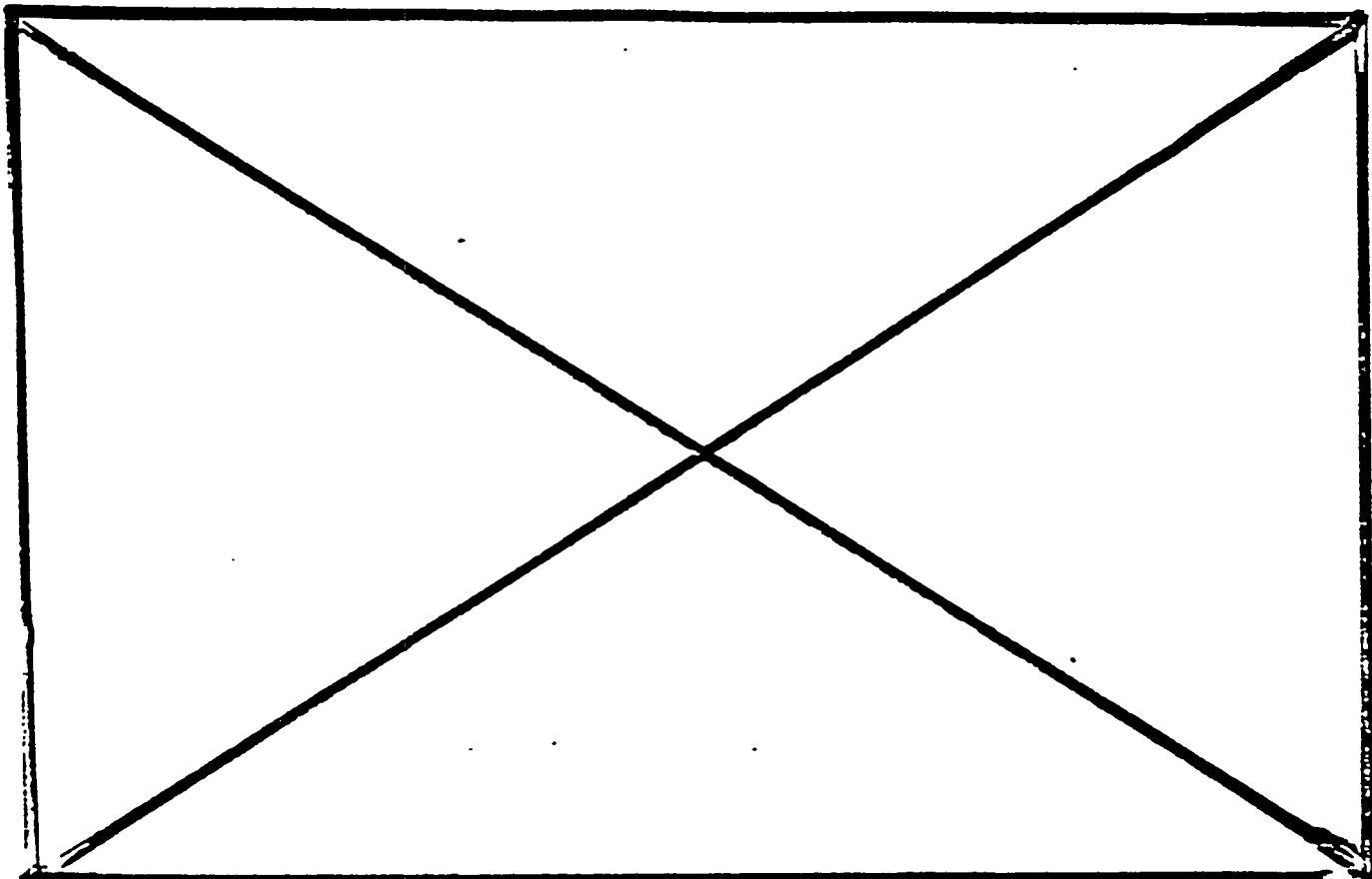
pilot plants

Y-DWG 83-787RA



operation facilities, Y-12 Plant, 1950 - 1963.

Water overflow from the second tank went into a sump with a weir outside and adjacent to the building. Overflow from this sump entered the storm sewer system. These systems contributed significantly to the reduction of mercury discharged into the creek.



6.2.4 The New Hope Pond Project

In the early 1960s, the need for a technique to equalize the pH of the effluent from the Y-12 Plant was recognized. A water distribution system was designed that would permit a 24-h retention and mixing time for the daily plant discharge of $\sim 2.3 \times 10^7$ L (6×10^6 gal). The system would also provide significantly better control over the discharge to East Fork Poplar Creek. The liquid effluent from the plant, both historically and now, discharges into the headwaters of the East Fork of Poplar Creek, which then flows through parts of the city of Oak Ridge.

In 1963, a five-acre pond was constructed at the east end of the plant at a cost of \$193,500. The pond, named New Hope Pond after an old community in the area, has proportional sampling systems at the inlet and at the outlet. The pH is recorded continuously and is telemetered into the Plant Emergency Control Center where pH changes can be observed. Also, the flow of the stream is continuously recorded by a depth recorder that has been calibrated against a specially designed weir.

The pond design includes a special water distribution system with 15 separate inlets for equal dispersions of liquid into the main body of the pond. The pond's primary purpose of pH equalization was accomplished, and the additional benefit of a settling basin for insoluble materials, including mercury, was also realized. In 1973, the sediment was dredged and the sludge transferred to a dry basin on the top of Chestnut Ridge, south of the pond.

Before the pond was constructed, the pH of the stream (as it left the plant) fluctuated between values of 3 to 12; however, since the completion of the pond, the pH has consistently remained within the limits acceptable (6 to 9) for fish and other aquatic life as stipulated by the state of Tennessee.

In the mid-1970s, a water gate was installed at the outlet of New Hope Pond to enable the plant to retain all plant effluent for several hours in the event of a large chemical or oil release. With this safeguard of increased residence time, the plant effluent can be treated chemically or the oil recovered while the badly contaminated effluent is still in New Hope Pond (i.e., before it is discharged into East Fork Poplar Creek). Oil can be recovered with the available floating oil skimmer if the primary oil skimmer has failed.

Currently, plans are to construct a New Hope Pond bypass that will permit long-term retention within the pond. This capability will provide additional available time to treat, neutralize, or precipitate the spilled substance. In addition to the New Hope Pond system, ORGDP maintains an oil skimmer on the East Fork of Poplar Creek, upstream of the confluence with Poplar Creek. In case of emergencies, this system can be activated to reduce the amount of oil discharged into the waters of Poplar Creek.

6.2.5 Other Programs Prior to 1983

Although the Colex processes were shut down in 1963, mercury cleanup activities have continued over the years in Buildings 9201-4, 9201-5, 81-10, 9204-3, and other areas. Small quantities have been found in cabinets, basements, and similar places. Approximately 7 gal (800 lb) were recovered from a pipe in Building 9201-2. On a continuing basis, the Alpha-5 Processing Department has been responsible for cleaning up all mercury spills in the Y-12 Plant. This includes spills from manometers, Bailey transmitters, and broken thermometers of all shapes and sizes. Mercury that was picked up was added to the storage tanks in Building 9201-4.

6.3 CHRONOLOGY OF ENVIRONMENTAL AND PUBLIC HEALTH STANDARDS, 1950 TO 1983

The following table lists the applicable standards in 1950 and 1983.

	<u>Reference</u>	<u>1950</u>	<u>1983</u>
Air - Work place	7	0.1 mg/m ³	0.05 mg/m ³
Air - Emissions	8	-	1 ug/m ³
Water - Drinking	9	-	0.002 mg/L or 2.0 ppb
Water - Stream State of Tenn. (for fish and wildlife)	10 and 11	-	0.05 ug/L or 0.05 ppb
(for domestic water supply)		-	0.2 ug/L or 0.2 ppb
Effluent - Tenn.	11	-	0.05 mg/L or 50 ppb
Fish - Edible	12	-	1.0 ug/g or 1,000 ppb
Solids burial	13	-	0.2 mg/L or 200 ppb

In 1950, the standard recommended by ACGIH was available as a guide to limit worker exposure to mercury in the work place. There were no other standards, state or federal, to limit releases of mercury to the environment. The efforts at Y-12 were, as described in Section 5, concentrated on minimizing worker exposure to mercury vapor and keeping process losses as low as possible. Following the discovery of biological methylation and its announcement in 1970, many standards have been established to limit releases of mercury to the environment and protect the general public. Comments on each standard follow. It should be noted that none of the 1983 standards deal specifically with organic forms of mercury. The standards deal with inorganic mercury and total mercury only.

6.3.1 Air - Work Place (ACGIH) (Ref. 7)

The work place threshold limit values (TLV) designed to protect the health and safety of workers are discussed in detail in Section 5.2.

6.3.2 Air - Emissions (NESHAP) (Ref. 8)

In 1973, the Environmental Protection Agency (EPA) established the National Emission Standard for Hazardous Air Pollutants (NESHAP). The standard specifies that emissions from stationary sources that process mercury ore to recover mercury and facilities that use mercury chlor-alkali cells to produce chlorine gas and alkali metal hydroxide shall not exceed 2,300 g of mercury during a 24-h period, as measured in accordance with techniques set forth in the standard. This amount would limit the air concentration in the vicinity of emission sites to a daily level, averaged over 30 d, of 1 ug/m³, which is believed

sufficient to protect the health of the public from any effects from inhalation of mercury with an ample margin of safety.

6.3.3 Water - Drinking (EPA) (Ref. 9)

In 1975, National Interim Primary Standards were promulgated under the Safe Drinking Water Act and set a limit of 0.002 mg/L or 2 ppb for mercury in drinking water. This is the acceptable level for mercury in water for humans to drink.

6.3.4 Water - Stream (EPA and Tennessee) (Refs. 10 and 11)

"The Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500) mandated that the Environmental Protection Agency publish water quality criteria accurately reflecting the latest scientific knowledge on the kind and extent of all identifiable effects on health and welfare which may be expected from the presence of pollutants in any body of water" (Ref. 10). The 1976 criterion for mercury was 0.05 ug/L or 0.05 ppb for freshwater aquatic life and wildlife and was adopted by Tennessee as the criterion for fish and aquatic life. The EPA changed the criterion to 0.2 ug/L or 0.2 ppb in 1981, but Tennessee still retains the 1976 criterion of 0.05 ug/L or 0.05 ppb, one-fortieth of the level acceptable for drinking water.

6.3.5 Effluent Discharges (Tennessee) (Ref. 11)

The Tennessee Water Quality Control Act established effluent guidelines enacted in 1977 that require industrial wastewater treatment plants to achieve a daily concentration of 0.05 mg/L (ppm) for mercury, or better.

6.3.6 Fish Flesh (FDA) (Ref. 12)

On December 6, 1974, the Commissioner of Food and Drugs proposed to adopt an action level of 0.5 ug/g (ppm) for unavoidable residues of mercury in the edible portion of fish and shellfish. This proposal was terminated and replaced with a proposed action level of 1.0 ug/g (ppm) on January 19, 1979. One-half pound of fish per week (~1 oz/d) at 1.0 ug/g (1 ppm) provides a tenfold margin of safety over known toxic levels.

6.3.7 Solid Waste Disposals (U.S. EPA Extraction Procedure) (Ref. 13)

In 1976, the Resource Conservation and Recovery Act (RCRA) established guidelines for the handling of hazardous wastes. One criterion for determining whether a waste is hazardous is toxicity, and the EPA Extraction Procedure (EP) was designed to determine whether a waste is toxic. Waste which is leached under tightly controlled conditions and which gives a leachate that is 100 times the drinking water limit for a particular contaminant is deemed to be toxic. The

drinking water limit for mercury is 0.002 mg/L (2 ppb) which sets the EP limit for mercury at 0.2 mg/L (200 ppb).

6.4 MONITORING FOR MERCURY

6.4.1 Air

The estimated mercury loss to the air during the operation of the lithium cascades is shown below:

Alpha-4 and Alpha-5 operations	38,000 lb
Beta-4 operations	8,300 lb
Beta-4 scrap	<u>5,000</u> lb
TOTAL	51,300 lb

The reasons for the above and the basis used to estimate these losses are explained in Section 4.1. Samples were taken with a portable General Electric Mercury Vapor Monitor. This lower detection limit was $\sim 0.1 \text{ mg/m}^3$. The meters were calibrated routinely.

6.4.2 Water

The estimated mercury lost to East Fork Poplar Creek during the operation of the Colex lithium cascades is summarized by quarter in Table 6.1 for the period 1955 through 1963. In addition to these losses, other sources of mercury loss have been recognized, and the estimates for these losses are as follows:

Pre-1955	11,300 lb	
1955-1963	210,038 lb	218869 - 210038
1963-April 1983	8,831 lb	8,831
Metallic mercury, etc.	7,500 lb	
Storm effects	<u>1,275</u> lb	
TOTAL	238,944 lb	

The basis for measuring and/or estimating these losses is explained in Section 4.2.2. The average mercury concentration and the average stream flow rate for each quarter are also provided in Table 6.1. Table 4.4 shows the data from 1955 through 1982. The data presented in Table 6.1 are graphically displayed in Figures 6.5, 6.6, and 6.7.

Table 6.1. Estimated mercury lost to East Fork Poplar Creek

Year	Quarter			Yearly total (lb)
	1	2	3	
1955				5,881 ^a 0.709 10.8 ^c
1956	3,192 0.359 11.7	5,512 0.642 11.3	13,711 1.654 10.8	8,738 0.956 11.9
1957	15,954 1.609 13.2	19,497 2.422 10.6	21,993 3.015 9.5	14,970 1.805 10.8
1958	26,317 3.650 9.6	21,854 3.062 9.4	7,941 1.246 8.3	8,484 1.417 7.8
1959	6.246 0.990 8.4	5,440 0.738 9.7	5,329 0.738 9.4	1,589 0.197 10.5
1960	1,514 0.186 10.7	1,471 0.198 9.8	2,255 0.330 8.9	1,475 0.216 8.9
1961	949 0.133 9.5	841 0.103 10.8	1,925 0.230 10.9	1,063 0.118 11.7
1962	2,032 0.205 13.2	857 0.084 13.4	200 0.021 12.4	1,790 0.210 11.1
1963	169 0.016 14.1	441 0.040 14.7	249 0.032 10.2	162 0.025 8.5
TOTAL				210,038

^aMercury lost (lb).^bAverage mercury concentration (mg/L).^cAverage stream flow rate (million gal/d).

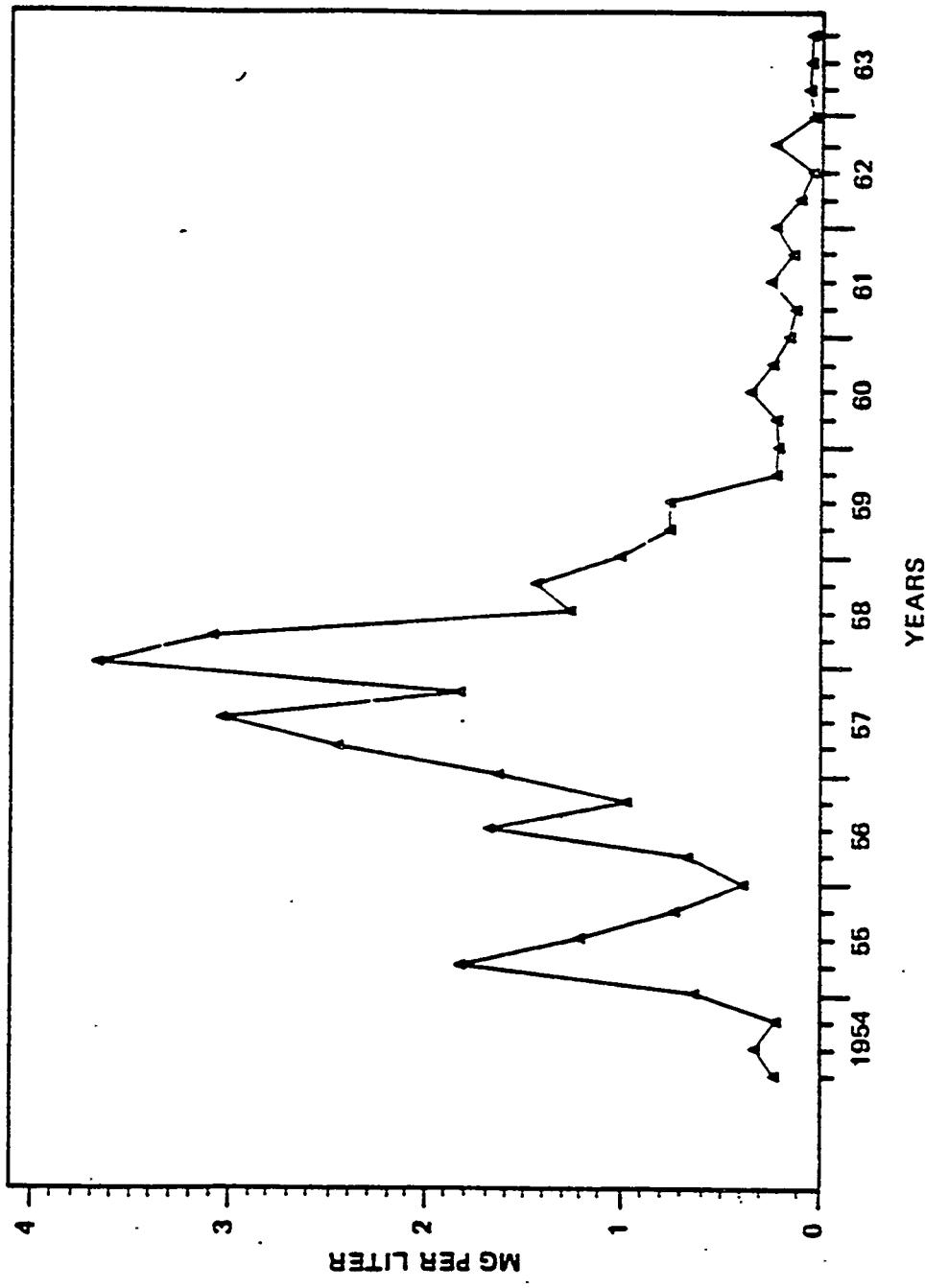


Fig. 8.5. Mercury concentrations for East Fork Poplar Creek.

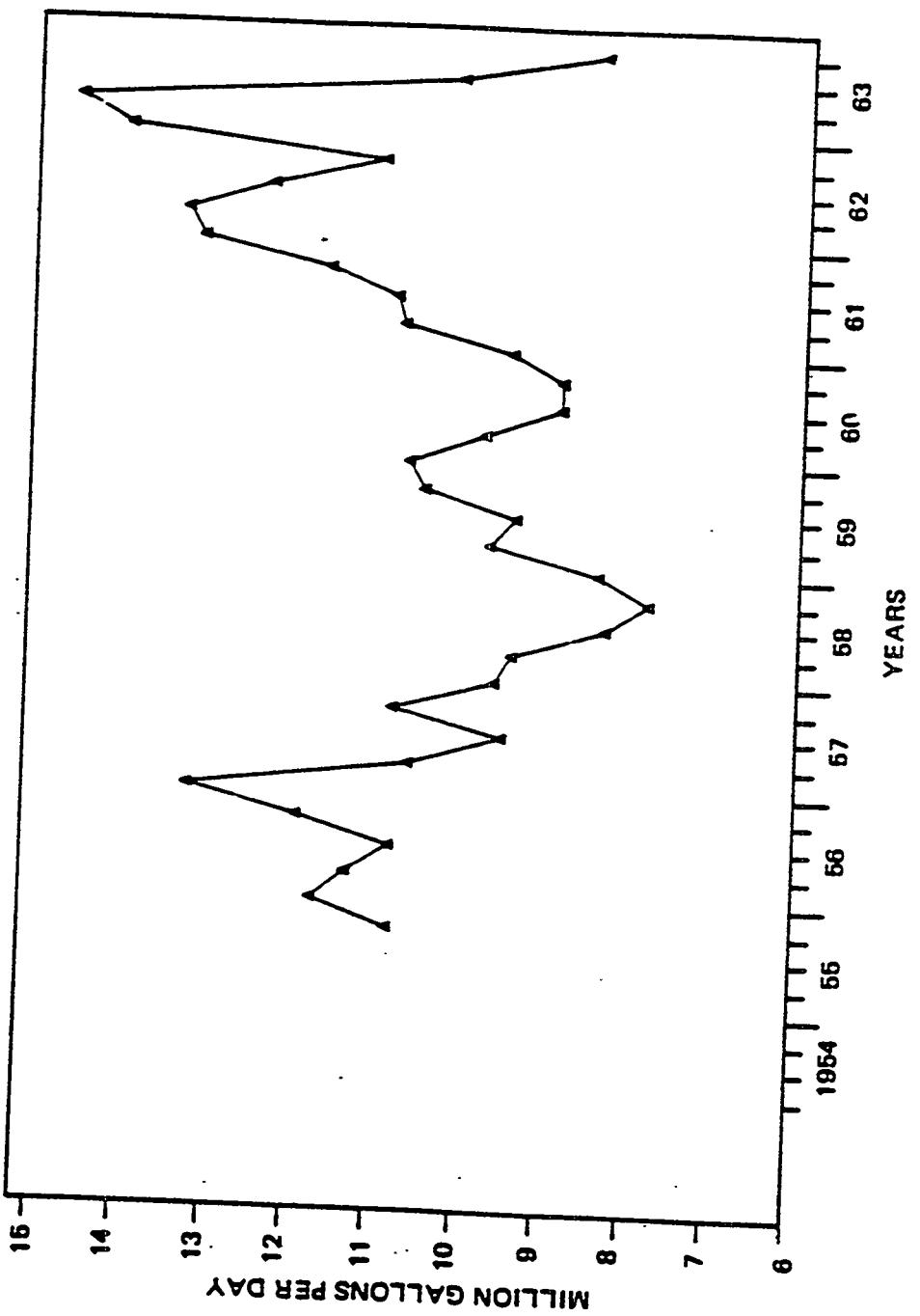


Fig. 6.6. Stream flow rates for East Fork Poplar Creek.

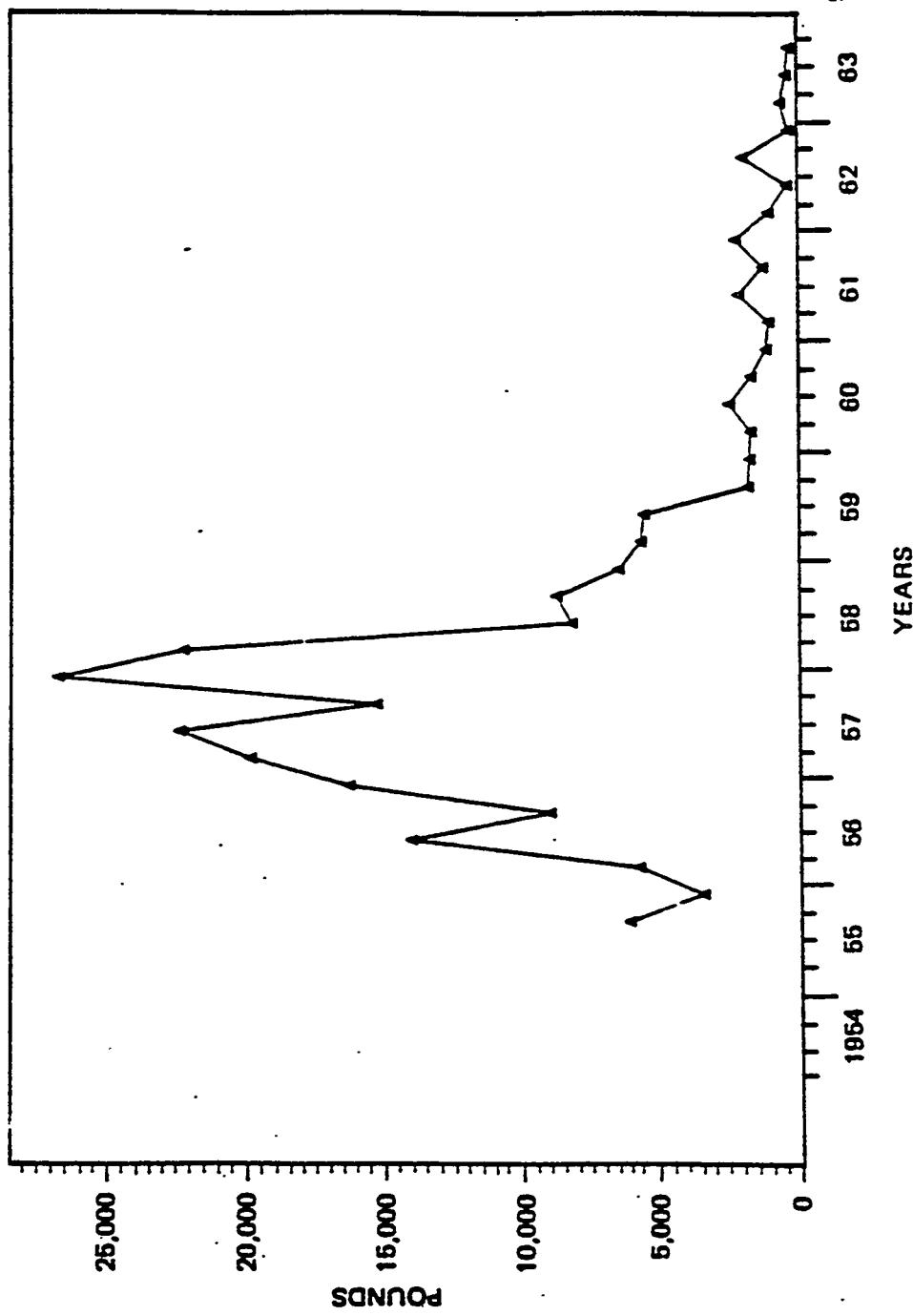


Fig. 6.7. Mercury losses to East Fork Poplar Creek.

6.4.3 Sampling Methods

Composite samples of East Fork Poplar Creek have been collected for laboratory analysis since the early 1950s. The information generated was used primarily to monitor process losses. After the processes that produced the mercury losses were discontinued, the sampling and analysis continued and formed the basis of the environmental monitoring effort of Y-12 in the 1960s.

The EPA Method 245.1 for mercury, issued in 1974, recommends that samples be preserved by acidification with nitric acid to a pH of 2 or less at the time of collection to avoid losses of mercury upon storage. Composite samples intended for the monitoring of many water-quality parameters cannot be preserved by acidification, and therefore, all mercury results on composite samples from 1951 to the present were obtained on unpreserved samples. Separate grab samples for mercury have been collected since 1977 and preserved by acidification in the Y-12 Plant laboratory. Since September 1982, grab samples have been acid-preserved in the field at the time of collection.

From 1951 to 1955, a Y-12-designed "trickle sampler" was used to collect weekly composite samples of East Fork Poplar Creek water. The sampler was designed to collect a 5-gal composite sample in a week. The sample collected from the top of the stream did not represent all the suspended particulate matter in the creek, and therefore, the mercury data obtained from these samples were likely biased to give lower amounts than what was actually present. An estimated correction factor was therefore applied in the above table.

In 1955, a Tennessee Valley Authority (TVA)-designed system was installed in the creek behind Building 9720-8. The system consisted of a weir from which flow estimates were made and a "tribullar sampler" (a dipper type) that provided time-proportional, weekly, 5-gal composites.

In 1963, New Hope Pond was constructed, and the sampling point for the weekly composites was moved to the outfall of the pond. A time-proportional sampler was used to fill a 55-gal drum from which the weekly composite was taken. Starting in 1973, the weekly composites were poured into a larger bottle to form a monthly composite that was analyzed for mercury and other constituents. Since December 1977, weekly grab samples have also been taken at the outfall of the pond and analyzed for mercury. In mid-1981, the time-proportional samplers used since 1963 were replaced with flow-proportional samplers.

6.4.4 Analytical Methods

From 1951 until June 1957, the mercury content of East Fork Poplar Creek water was determined by a colorimetric technique adopted from methods published by Snell and Snell. The method involved wet ashing the sample with sulfuric acid and potassium permanganate followed by a chloroform extraction of a mercury-dithizone complex. The complex was then measured spectrophotometrically at 485 nm. This method provided a lowest concentration reported of 0.1 mg/L (0.1 ppm) with a relative limit of error for a single analysis of $\pm 50\%$.

Now do
duplicate
samples?
compare?

In July 1957, the colorimetric method was replaced by the Mercurrometer method, which involved isolation of the mercury as the sulfide* followed by vaporization in a heated chamber and detection with a General Electric mercury vapor detector. The method provided a much shorter analysis time, a lowest concentration reported of 0.01 mg/L, and a relative limit of error for a single analysis of $\pm 40\%$.

In August 1967, an atomic absorption method providing a lowest reported concentration of 0.001 mg/L with a relative limit of error for a single analysis of $\pm 20\%$ was adopted. The method in use today is based on EPA Method 245.1 and involves an acid-permanganate-persulfate digestion for 2 h at 95°C followed by reduction of the mercury to the elemental state and aeration from solution. The mercury vapor passes through a cell positioned in the light path of an atomic absorption spectrophotometer, and an absorption measurement is made.

6.4.5 Measurement Control Programs

The Y-12 Plant had laboratory measurement control programs in operation during the 1950s, but the detailed records and data from control programs prior to July 1959 have been destroyed in accordance with records management policies. Interviews with personnel involved in the measurement control program indicate that during the 1950s, measurement controls were maintained both for the analysis of mercury in water as well as air. Current measurement control programs include analysis for mercury in water and urine. There is no recollection or evidence that any studies of sampling errors were completed in relation to mercury measurements.

6.5 STUDIES DURING THE 1970s AND 1980s

6.5.1 Introduction and Overview

The Recognition of the Role of Biological Methylation

In 1953, cases of mysterious nervous disorders began to appear among the fishing population of Minamata, Japan. The symptoms were caused by methylmercury poisoning that came from high concentrations in fish and shellfish caught in the bay and consumed by victims. By the end of 1965, more than 160 cases and 52 deaths had been reported. The source of the contamination was a chemical plant that discharged large quantities of methylmercury into the bay. The severity of the problem was magnified by the fact that fish and shellfish were the dominant constituents of the diets of the residents of that area of Japan.

*This was done by filtering the sample through a filter paper impregnated with cadmium sulfide. All mercury would be trapped, most converted to the highly insoluble sulfide.

In 1967-1968, it became known that inorganic mercury released to the aquatic environment can be converted by natural biological processes to methylmercury and that the mercury found in fish is almost all methylmercury. The alkyl (methyl and ethyl) mercury compounds are 10 to 100 times more toxic than inorganic mercury compounds. Therefore, a new concern was raised all over the world that dumping of inorganic mercury compounds into waterways might be much more of a problem than hitherto regarded.

Norvald Fimreite, a Canadian scientist, has been credited (Chemical and Engineering News, July 1971) with sounding the alarm after he found very high levels of mercury in fish in a Canadian lake and traced them to biological methylation of inorganic mercury compounds. Commenting on Fimreite's discovery, the author said, "He [Fimreite] will occupy the same spot in the environmental revolution as Paul Revere does in the American Revolution" (Ref. 14). Considerable publicity was generated because of the discovery, leading to the further studies of the mercury levels in fish. In these studies, chlor-alkali plants were pointed out as typically discharging 5 to 60 lb/d of inorganic mercury in 1971.

In September 1970, an ORNL study showed that there were 18 states where some restrictions on fishing were in effect. Tennessee had banned fishing in the Holston River because of high mercury levels in the fish there (up to 4.4 ppm). In an interview in 1971, the President of Dow Chemical Company said, "No one realized until recent (1967-1968) research in Sweden brought it to light that mercury itself could be biologically converted to organic dimethylmercury When I say no one, I mean no one in Dow, no one in industry, no one in government or in universities."

In another major article of that time, a review in the May 1971 issue of Scientific American, entitled "Mercury in the Environment," Goldwater stated, "Although recent incidents give us justifiable concern about the potential hazards, a panicky reaction would be quite inappropriate The uncompounded element in liquid form is not a poison; a person could swallow up to a pound or more of quicksilver with no significant adverse effects. Nor should it be forgotten that certain compounds have been used safely for thousands of years . . . as effective medications" But he cautioned that biological methylation must now be considered a route to ingestion previously not recognized.

6.5.2 The 1970 Sanders Study

In 1970, as a result of the early publications relating to this newly recognized source of concern, Merwyn Sanders, Y-12 Environmental Coordinator, initiated a study of mercury content in fish, water, and sediment samples collected in the Oak Ridge area. There were no FDA guidelines, and control samples were not available. The U.S. Public Health Service suggested a limit for mercury content in fish of .

0.5 ppm. In order to have some control fish for comparison, Sanders purchased some fresh fish from a local fish market and the Y-12 cafeteria. The results of his study were given in a memorandum to J. D. McLendon, dated August 6, 1970. The results on fish and sediments are summarized below.

STUDY ON FISH^a

<u>Source of fish</u>	<u>No. of fish</u>	% Of fish exceeding USPHS suggested standard of 0.5 ppm	<u>ppm Mercury</u>			<u>Species of fish</u>
			<u>Low</u>	<u>Avg.</u>	<u>High</u>	
Discharge of New Hope Pond into East Fork Poplar Creek	12	75%	0.32	0.71	1.30	Bluegill, carp
Bear Creek	9	11%	0.005	0.18	0.78	Bluegill, carp, crayfish
Oak Ridge fish market and Y-12 cafeteria	7	14%	0.027	0.22	0.67	Squab, catfish, bass, mackerel, snapper, sole

^aIncludes several shellfish.

STUDY ON SEDIMENTS

<u>Location of sample</u>	<u>No. of samples</u>	<u>ppm Mercury</u>		
		<u>Low</u>	<u>Avg.</u>	<u>High</u>
New Hope Pond	1	63.00	63.00	63.00
East Fork Poplar Creek	3	0.90	4.60	11.30
Bear Creek	5	0.04	0.15	0.23
Melton Hill (control)	1	0.01	0.01	0.01

The results on mercury content on water are consistent with those reported elsewhere in this document (see Sect. 4).

6.5.3 The 1972 Insecticide, Herbicide, and Pesticide Study

Samples of commercial insecticides, herbicides, and pesticides used by Rust Engineering in Union Carbide Corporation, Nuclear Division (UCC-ND), Oak Ridge facilities were analyzed for mercury in 1972. The mercury content ranged from 0.041 to 0.40 ppm for the samples analyzed and showed that methyl or other alkyl mercury compounds were not being used for spraying in the area (Ref. 15).

6.5.4 The 1974 Reece Study

A survey of East Fork Poplar Creek and Bear Creek was made by John Reece for U.S. Atomic Energy Commission (AEC) and was a continuation of surveys made during the summers of 1972 and 1973. The project was intended to identify possible areas of concern and to determine the continuance or abatement of some previously identified problems. By the author's own disclaimer, the project was short-term, low-cost, limited, and in no way represented a final evaluation of conditions in the areas concerned.

Although water and sediment samples were collected from East Fork Poplar Creek, Bear Creek, and Poplar Creek, the water samples were not analyzed for mercury. Sediment samples, however, showed mercury levels ranging from less than 0.05 ppm to 72 ppm. Sites with the highest readings are indicated below.

<u>Site</u>	<u>Miles downstream from Y-12</u>	<u>Core sample level analyzed</u>	<u>Mercury level (ppm)</u>
East Fork Poplar Creek	4	Top	16
		Middle	7
		Bottom	5
East Fork Poplar Creek	5	Top	18
		Middle	25
		Bottom	22
East Fork Poplar Creek	6	Top	7
		Middle	72
		Bottom	36

John Reece concluded that although Y-12 discharges had increased mercury levels in the sites sampled, the exact location and amounts of deposits were unclear. He also noted that the floodplain soil at two of the sampled sites appeared to be similar to the core sample sediments, which indicated a need for soil sampling on the floodplains (Ref. 16).

6.5.5 The 1977 Elwood Study

In 1974, fish, benthic invertebrates, and sediments were collected from streams draining the Energy Research and Development Agency's (ERDA) Oak Ridge Reservation and analyzed for several heavy metals. The sampling and analysis were conducted to provide information for the environmental impact analysis of ERDA-Oak Ridge Operations (ORO). To verify the apparent mercury contamination in the Poplar Creek-Clinch River drainage and to establish the extent of contamination in fish from these environs, ORNL was requested by ERDA-ORO to collect fish from Poplar Creek and the Clinch River and to analyze these samples for mercury.

Fish were collected by electrofishing in May, June, and October 1976 from eight sampling areas, including the Clinch River above and below the mouth of Poplar Creek, Melton Hill Reservoir, and Poplar Creek below the confluence with East Fork Poplar Creek. Bottom sediments from Poplar Creek and the Clinch River were sampled for mercury analysis in July 1974 and in both July and November of 1975 and 1976.

Concentrations of mercury in most species of fish analyzed by Elwood exhibited elevated concentrations in those from Poplar Creek and Clinch River relative to concentrations in the same species of fish collected from other sampling areas. For example, reported concentrations in bluegill and large mouth bass (0.40 and 0.64 ppm, respectively) from Pickwick Reservoir, which received significant inputs of mercury from a chlor-alkali plant prior to 1971, are comparable to average values in the same species (0.37 to 0.73 ppm) from Poplar Creek. Fish from mercury-contaminated waters usually exceeded 0.1 ppm while those from "uncontaminated" environment were nearly always below 0.1 ppm. The concentration of mercury in several fish collected exceeded the FDA proposed limit of 0.5 ppm of mercury. In some species, up to 95% of the mercury in fish muscle was in methylmercury form.

Results for the sediment sampled in Poplar Creek showed considerable variability among the sites. For example, the mean average for all sediment samples collected in an area of Poplar Creek was 14.2 ± 48.3 ppm mercury, and two of the samples contained 300 ppm. Clearly, these two samples had a pronounced influence on this average. If they were excluded from the calculation, the mean average would be 6.3 ± 5.6 ppm of mercury. The reason for such a wide variation in values is attributed to the differences in the particle sizes of the sediments sampled.

The results of the study of the fish and sediments of Poplar Creek and the Clinch River suggest that the East Fork Poplar Creek drainage is the major contributor to the elevated levels of mercury in sediments and fish in the Clinch River below the mouth of Poplar Creek (Ref. 17).

6.5.5.1 May 4, 1977, Meeting with TVA's Division of Environmental Planning

In May 1977, representatives of TVA's Division of Environmental Planning, ERDA-ORO's Environmental Protection Branch, and UCC-ND's Office of Health, Safety, and Environmental Affairs met and reviewed data obtained as part of the 1976 program of sampling in Poplar Creek, Clinch River, and Melton Hill Reservoir. Most of the data discussed were from the Elwood Study. The report of that study had not been issued at that time.

In a letter to W. H. Travis, Director of the ERDA Safety and Environmental Control Division, written several days after the TVA meeting, J. F. Wing (ERDA) summarized the reactions of the TVA personnel (Ref. 18). He noted that, while interested, the TVA representatives were not alarmed in any way and knew of several other areas in the TVA system where mercury concentration levels in fish were

worse. The TVA representatives requested that they be provided with any available mercury-in-sediment data. Positive interest was expressed by TVA in adding the Poplar Creek area to its regular monitoring program. In his letter, J. F. Wing stated that his group was hopeful that TVA would choose to do this, noting that the Poplar Creek mercury levels would then be reported by TVA relative to other areas where mercury levels were higher.

6.5.6 The Union Carbide Environmental Monitoring Reports

Since 1971, UCC-ND has issued annual reports on the Environmental Monitoring Program for the Oak Ridge area. The reports contain general descriptions of the program that includes sampling and analysis of air, water from surface streams, creek sediments, biota, and soil for both radioactive and nonradioactive materials.

These documents were produced for release to the public and copies were distributed to the EPA, the Tennessee State Health Department, the Oak Ridge Department of Public Health, and the Knoxville office of the Tennessee Environmental Health Services. Media copies were sent to the Knoxville Bureaus of Associated Press and United Press International as well as the Knoxville Journal, Oak Ridger, Clinton Courier News, and Roane County News.

From 1971 through 1982, these documents have reported on the chemical concentrations in the water sampled at the outlet of New Hope Pond on East Fork Poplar Creek. The samples were analyzed for a variety of water-quality parameters related to process release potential and background information needs by analytical procedures recommended by the EPA. Table 6.2 shows the mercury concentration levels reported in these documents for the years 1971 through 1982. For comparative purposes, the present EPA criteria is 0.2 ppb (0.0002 ppm) and the Tennessee criteria is 0.05 ppb (0.00005 ppm).

Table 6.2. Mercury concentrations in
East Fork Poplar Creek water^a

Environment monitoring report	No. of samples	Mercury concentration, mg/L (ppm)		
		Max.	Min.	Avg.
CY 1971	9	0.0070	0.0005	0.003
1972	12	0.0009	<0.0005	0.0006
1973	12	0.001	0.0003	0.0005
1974	12	<0.0005	<0.0005	<0.0005
1975	12	0.0009	<0.0005	<0.0006
1976	12	0.0008	<0.0005	<0.0005
1977	12	0.003	<0.0005	<0.0001
1978	12	0.002	<0.0005	<0.0001
1979	12	0.004	<0.001	<0.002
1980	12	0.003	<0.001	<0.002
1981	12	0.002	<0.001	<0.002
1982	12	0.007	<0.001	<0.002

^aStream is not a source of drinking water.

Beginning in 1975, the authors extended the coverage of the mercury-in-water analysis program to include samples taken at other locations (e.g., Poplar Creek above Blair Bridge, Poplar Creek near the Clinch River, and the Clinch River downstream of ORGDP).

The coverage of the document was broadened again in 1977 to include the results of a study conducted in 1976 and 1977 on mercury levels in 649 fish taken from Poplar Creek, the Clinch River, and Melton Hill Reservoir. This information is summarized below.

<u>Source</u>	Representative average mercury concentrations (ppm)		
	<u>Poplar Creek</u>	<u>Clinch River</u>	<u>Melton Hill</u>
Largemouth bass	0.72	0.38	<0.02
Bluegill	0.42	0.15	<0.04
Crappie	0.23	0.14	<0.03

In addition to the above, the 1977 document contained the first report on the concentration of mercury in stream sediment samples. The data for the period 1977 through 1982 are summarized in Table 6.3.

From these data, the 1977 report concluded that such levels did not constitute a toxicity hazard, noting that the FDA-proposed action level of 0.5 ug/g did not apply to individual fish, rather to averages, in order to control total mercury consumption. The action level was based on a consumption rate of 60 g/d, that is three times the national average plus a safety factor of ten as well. Thus while some of the fish exceeded the proposed action level, an extraordinarily high and protracted consumption rate of these fish was said to be needed in order to reach levels of concern. (See Sect. 6.5.12.)

6.5.7 The 1981 Sampling by S. B. Gough

In December 1981, S. B. Gough, an ORNL biologist, collected samples of moss, liverwort, and sycamore roots at sites along Bear Creek and East Fork Poplar Creek. He and his brother, L. Gough, a scientist with the U.S. Geological Survey (USGS), had hoped to develop enough data to justify a joint DOE-USGS research project pertaining to heavy metals, such as mercury, arsenic, lead, and cadmium, reported to be in the local environment.

Although the samples were initially processed and analyzed at the USGS Geochemistry Laboratory in Denver, Colorado (Ref. 19), they were reanalyzed at the Y-12 Plant. Because of the differences in the analytical results, additional samples were collected by ORNL Environmental Sciences Division personnel and analyzed at the Y-12 Plant in May 1982.

In contrast to the work done by the Goughs, the May 1982 effort involved analyses of replicate samples, thereby allowing the results to be reported as averages with standard deviation values. Although data qualitatively confirm that mercury is present in moss and liverwort samples collected from East Fork Poplar Creek, they do not confirm the

Table 6.3. Stream sediment samples
mercury concentration^a (ug/g dry weight basis)

Station ^b	1977	1978	1979	1980	1981	1982
CS-1	0.3	<0.2	<0.2	4.0	1.0	3.0
PS-2	26.6	7.0	35.0	4.0	6.0	
PS-3	11.9					
PS-4	12.2					
PS-5	1.4	2.0	<0.3	6.0	4.0	
PS-6	39.0	8.0	11.0	12.0	10.0	10.0
PS-7	1.8					
PS-8	1.6					
PS-9	11.0	2.0	3.0	5.0	3.0	
PS-10	2.7	17.0	3.0	19.0	10.0	19.0
PS-11	4.6					
PS-12	2.9	6.0	<9.0	6.0	6.0	
PS-13	3.3					
PS-14	153.6					
PS-15	4.0	21.0	6.0	4.0	10.0	
PS-16	11.3					
PS-17	9.6	<2.0	<13.0	11.0	3.0	9.0
PS-18	20.4	5.0	4.0	10.0	6.0	9.0
PS-19	41.9	14.0	21.0	14.0	9.0	8.0
CS-20	0.4	<0.2	<0.2	1.0	46.0	3.0
PS-21		6.0	<1.0	4.0	3.0	51.0
PS-22		3.0	7.0	13.0	2.0	

^aConcentrations represent averages of semiannual samples.

^bStations PS-18 and PS-19 are above ORGDP, and Station PS-2 is at the mouth of Poplar Creek. Stations C-1 and C-20 are in the Clinch River upstream and downstream, respectively, of Poplar Creek outfall.

longitudinal profile of mercury uptake by the samples collected at the three sites by Gough in December 1981.

Although the mercury concentration levels were in the range of 4 to 30 ppm, they were not as high (in the range of 2.54 to 108.85) as those reported for moss in the ORNL Environmental Sciences Division study on the distribution of mercury in the environment at Almadén, Spain (Ref. 20).

A more complete discussion on this effort is provided in the Van Winkle report (Ref. 21) and in the following subsection.

6.5.8 The 1982 W. Van Winkle Study (Ref. 21)

A one-month study was performed by ORNL and Y-12 staff at the request of Y-12 Plant management to determine the concentration of mercury in sediment, fish, moss, and pasture grass in the East Fork Poplar Creek and Bear Creek drainages and to determine whether mercury was still being released from the Y-12 Plant. The results and the recommendations are summarized below:

Results

Sediment

Mercury concentrations in New Hope Pond sediments range from 107 ppm (surface) to 302 ppm (subsurface), with an average value of 186 ppm.

Mercury concentrations in East Fork Poplar Creek immediately below New Hope Pond are similar to surface sediments in New Hope Pond (107 ppm in New Hope Pond surface and 90 ppm in East Fork Poplar Creek near New Hope Pond), suggesting an active and common source in the Y-12 Plant.

Mercury concentrations in fine-grained sediments in East Fork Poplar Creek decrease with increasing distance from New Hope Pond, suggesting simple dilution of a point source (90 ppm at Rivermile 14.2 and 19 ppm at Rivermile 1.3).

The Y-12 Plant does not appear to be an active source of mercury for Bear Creek sediments. Downstream sediments contained essentially background concentrations of mercury (0.12 ppm at Rivermile 0.4 and 0.26 ppm at control point—tributary to Bear Creek).

Fish

Decreasing downstream trend in mercury concentration in bluegill in East Fork Poplar Creek supports conclusion of sustained mercury source in East Fork Poplar Creek headwaters (2.13 ppm at Rivermile 14.2 and 0.56 at Rivermile 1.3).

Mercury levels in 87% of bluegills collected around Rivermile 8.3 of East Fork Poplar Creek exceed FDA action level of 1.0 ppm in edible portion (9 out of 11; range 0.7 ppm to 2.2 ppm).

Although mercury levels in Bear Creek bluegill and all except one rock bass exceeded background concentrations, they did not exceed FDA action level.

Contaminated sediments are the probable indirect source of mercury for fish in East Fork Poplar Creek and Bear Creek.

It is reasonable to expect the majority of mercury in fish in East Fork Poplar Creek and Bear Creek to be methylmercury (1977 Elwood Study and other references).

Human consumption of fish from East Fork Poplar Creek containing more than 1.0 ppm mercury is likely, although the frequency and quantity of consumption are unknown.

Moss and Liverwort

There is a decreasing downstream trend in mercury concentrations in moss in East Fork Poplar Creek (34.0 ppm at Rivermile 13.8 and 14.3 ppm at Rivermile 1.3).

Mercury concentrations in moss in Bear Creek are appreciably lower than East Fork Poplar Creek (0.52 ppm at Bear Creek Rivermile 2.0 and 14.3 ppm at East Fork Poplar Creek Mile 1.3).

Moss and liverwort are not part of any food chain leading to man; consequently, these plants are not a direct health concern.

Pasture Grass

Mercury concentration averages 3.5 ppm for dead grass and 0.2 ppm for live foliage for pasture grass in East Fork Poplar Creek floodplain (range dead foliage, 0.37 ppm to 6.97 ppm - control 0.12 ppm, and range live foliage, <0.10 ppm to 0.23 ppm - control 0.10 ppm).

Calculations indicate that the mercury concentration in milk from cows grazing along East Fork Poplar Creek presents no hazard.*

Calculations indicate mercury concentration in beef from cattle grazing along East Fork Poplar Creek may exceed 1.0 ppm.*

Recommendations

1. Identify, decontaminate, and stabilize (or physically isolate) the area(s) yielding mercury-contaminated sediment to New Hope Pond.
2. Design and implement future dredging plans for New Hope Pond to minimize sediment resuspension and loss to East Fork Poplar Creek.

*No measurements were made of milk or beef samples.

3. Notify the Tennessee Department of Public Health of mercury concentrations of fish in East Fork Poplar Creek.
4. Post DOE property at those locations along East Fork Poplar Creek used by bank fishermen and boat fishermen.
5. Measure the concentration of mercury in hair from cattle or horses grazing along East Fork Poplar Creek.
6. Evaluate analytical and total procedural accuracy of the Y-12 analytical method at mercury concentration greater than 1.1 ppm using blind reference standards.
7. Evaluate further the historical mercury record contained in New Hope Pond sediments.
8. Monitor mercury concentration in sediments in East Fork Poplar Creek every two years and in Bear Creek every five years.
9. Following the start of operation of the New West End Sewage Treatment Plant, monitor in East Fork Poplar Creek:
 - a. Mercury concentration in fish.
 - b. Abundance and size distribution of the dominant sport fish and populations.
 - c. Sport fishing effort and catch.

6.5.9 The 1982 Mitchell Study

Ninety-six fish of fourteen different species were removed from Poplar Creek at three sites near ORGDP and were analyzed for organic mercury (all organic mercury was assumed to be methylmercury). The results are tabulated below.

<u>Location</u>	<u>Mercury contamination levels (ppm)</u>			<u>Percent of fish with Hg conc. >0.5 ppm</u>
	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>	
Near mouth of Poplar Creek	1.34	<0.05	0.19	4
Downstream of junction of East Fork Poplar Creek and Poplar Creek	1.07	0.06	0.43	31
Poplar Creek upstream of junction with East Fork Poplar Creek	0.78	0.06	0.32	15
For total group of 96 fish	1.34	<0.05	0.33	18

A letter report was issued for information within the ORGDP (Ref. 22).

6.5.10 Mercury Levels in Livestock From the East Fork Poplar Creek Floodplain

Following up on one of the recommendations in W. Van Winkle's study, hair samples were obtained in August 1982 from a cow and a horse that had been grazing on the contaminated floodplain of East Fork Poplar Creek and had been drinking water out of this creek. For comparison purposes, samples were also taken at the Comparative Animal Research Laboratory (CARL) from livestock that had not been exposed to mercury-contaminated grasses or waters. Because of suspected contamination during the chemical analysis of the cow's hair samples taken in August 1982, additional hair samples from the same cow were obtained in November 1982. The results are summarized below:

<u>Livestock examined</u>	Mercury concentration in livestock hair samples (ppm)			
	<u>08/17/82 sampling</u>	<u>11/15/82 sampling</u>		
	<u>Sample 1</u>	<u>Sample 2</u>	<u>Sample 3</u>	<u>Sample 4</u>
"Floodplain" Cow 1	0.25 0.09	0.67 0.08	<0.1 -	- -
"Floodplain" Cow 2	-	-	<0.1	-
"CARL" Cow 3	<0.02 -	<0.03 <0.02	- -	- -
"Floodplain" Horse 1	0.05 0.05	0.06 0.04	- -	- -
"Uncontaminated" Horse 2	0.03 0.03	- -	- -	- -
"CARL" Horse 3	0.04 0.04	0.04 0.05	- -	- -

In the preceding table, although Horse 2 came from the same farm as Horse 1, it was a yearling and had not grazed on the contaminated floodplain.

In November 1982, tissue samples were obtained from one of the two cows from which hair was being examined. The results appear to be consistent with the fact that the kidney is the organ of greatest mercury accumulation in most animal species, with the liver showing an accumulation as well. As indicated in the following table, the low levels of mercury in the kidneys and the liver and the lack of mercury

found in the brain and muscle would seem to indicate a fairly low exposure and uptake by that cow that had grazed on the contaminated floodplain of East Fork Poplar Creek.

	Mercury concentration in livestock tissue samples (ppm)	
	Sample 1	Sample 2
"Floodplain" Cow 2		
Kidney	0.05	0.08
Liver	0.03	0.03
Muscle	<0.01	<0.01
Brain	<0.01	<0.01

6.5.11 Preliminary Assessment of the Environmental Fate of Early (1955-1963) Aquatic Releases of Mercury From Y-12

As indicated in Figure 6.7, the largest aquatic releases of mercury occurred during early operations of the Colex cascades. The environmental fate of these large releases was partially traced in June 1983 by a brief sediment coring study in Watts Bar Lake. Watts Bar Lake was created in 1943 by the impoundment of the Tennessee River at Rivermile 530. Thus undisturbed sediments in this lake, which begins about 30 miles downstream of Y-12, should contain a record of mercury releases from the Oak Ridge facilities.

A 50-cm-long (20 in.) core obtained in 45 ft of water at Tennessee Rivermile 538.3 on June 21, 1983, contained a sharp peak in mercury concentration (7 $\mu\text{g/g}$) in sediment layers 34 to 36 cm below the surface layer (Fig. 6.8). A date of deposition of the layer at 34 to 36 cm can be determined by two methods. The first method makes use of the fact that the core bottomed-out in a soil-like layer with root remains, establishing that 50 cm is the entire thickness of sediment at this location. This thickness of sediment has taken 40 years to accumulate, and thus the average annual sedimentation rate is 1.25 cm/year (0.5 in./year), yielding an approximate date for the layers at 34 to 36 cm of 1955.

The second method employs radionuclide release data for White Oak Lake since 1949 (obtained from ORNL-5878). Radionuclides, especially ^{137}Cs , released from the Oak Ridge facilities are incorporated into downstream sediments in the same manner as mercury. Figure 6.9 shows the ^{137}Cs profile for the core from Tennessee Rivermile 538.3 while Figure 6.10 shows the ^{137}Cs release data. Overlaying these figures and aligning the two largest peaks demonstrates a remarkable correspondence of the 1949 high release with the small peak on the left shoulder of the sediment ^{137}Cs graph. This strongly suggests that the release graph can be used to establish deposition dates for each layer. By this analysis, the layer at 34 to 36 cm with the highest mercury concentration was deposited in about 1956. This history of mercury accumulation in Watts Bar Lake fits the mercury release history for Y-12 (Fig. 6.8) exceedingly well and indicates that the most contaminated sediments are buried under at least 25 cm (10 in.) of sediments containing only slightly elevated mercury levels (<1 $\mu\text{g/g}$).

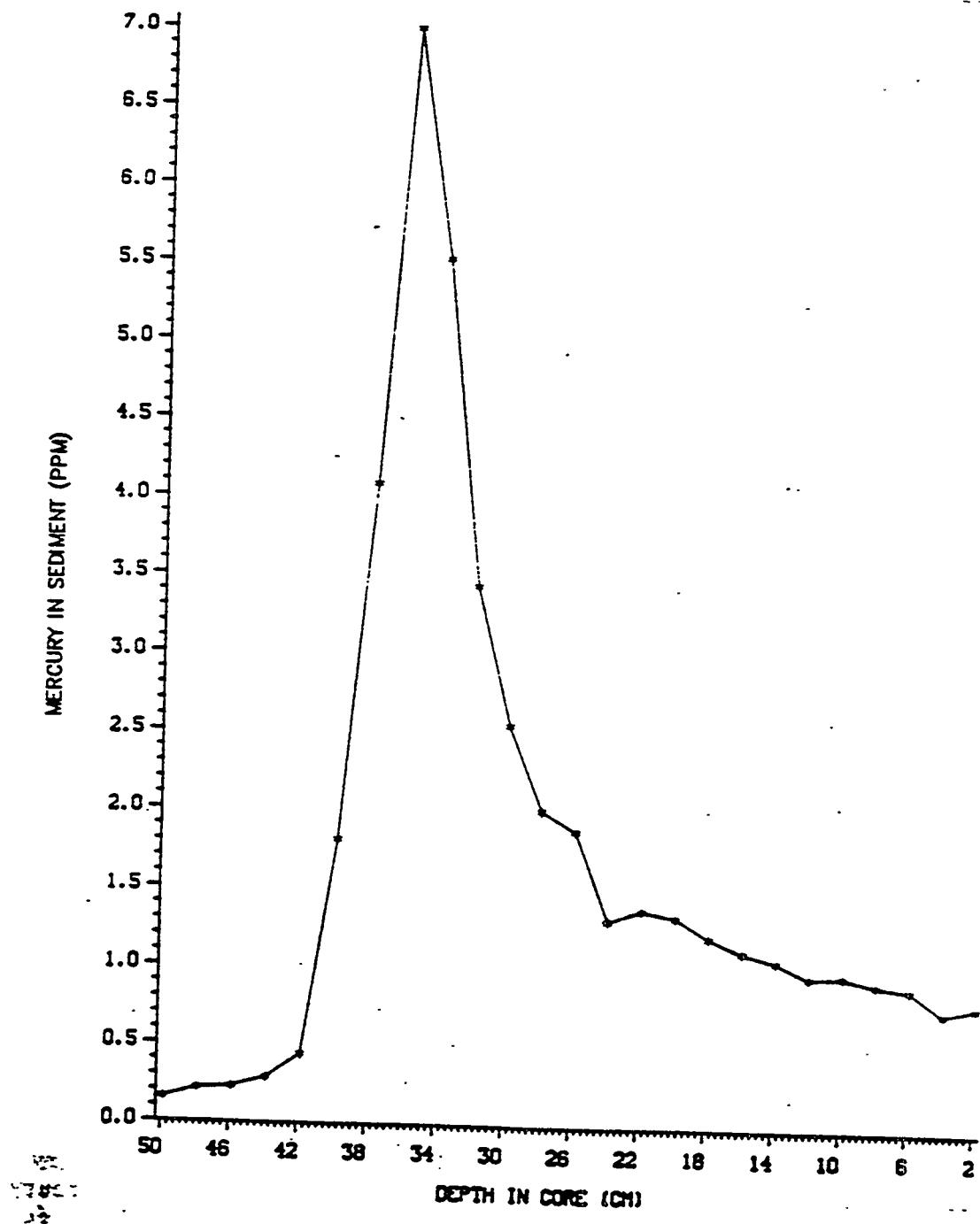


Fig. 6.8. Mercury in sediment cores from Watts Bar.

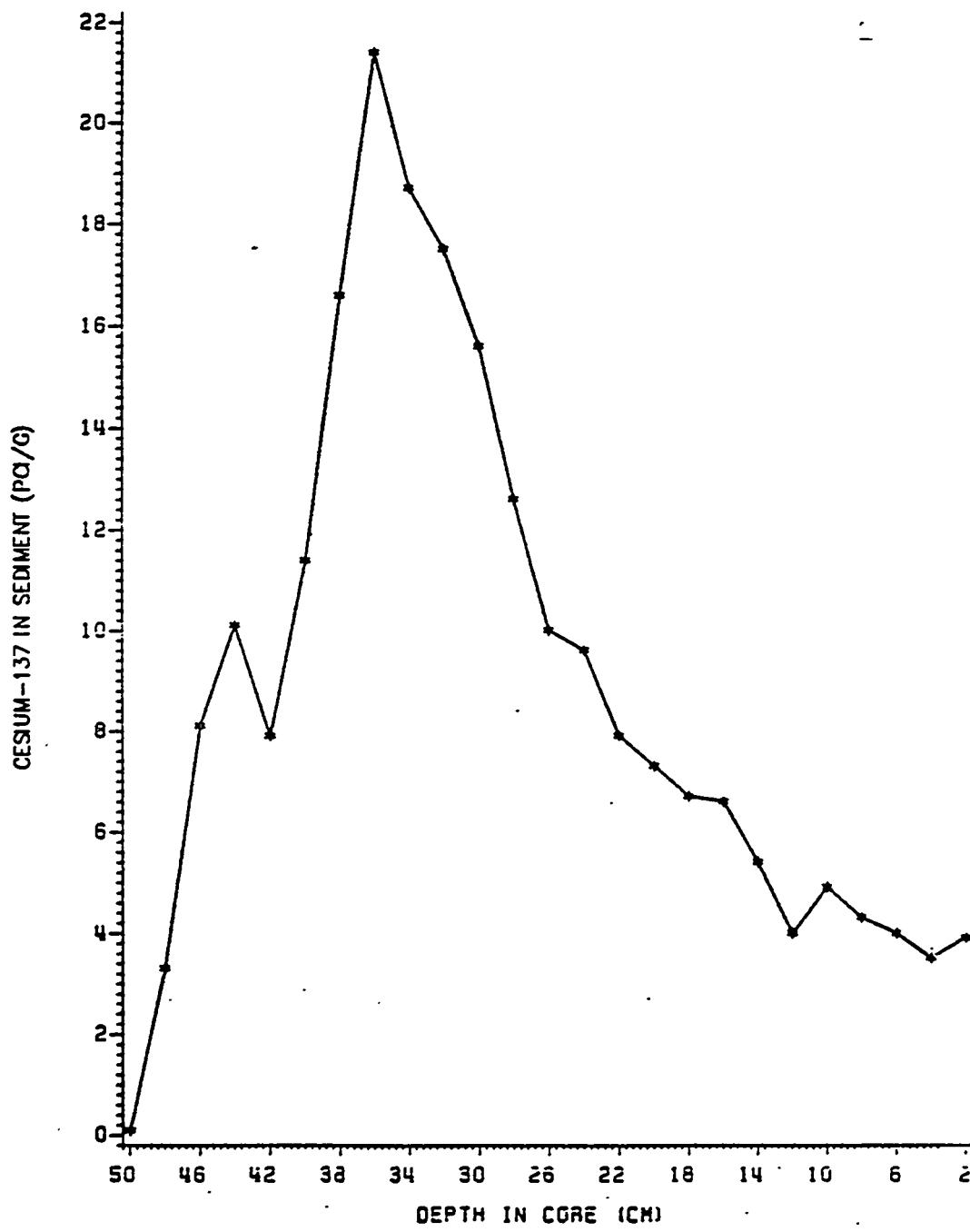


Fig. 6.9. Cesium-137 activity in core from Watts Bar.

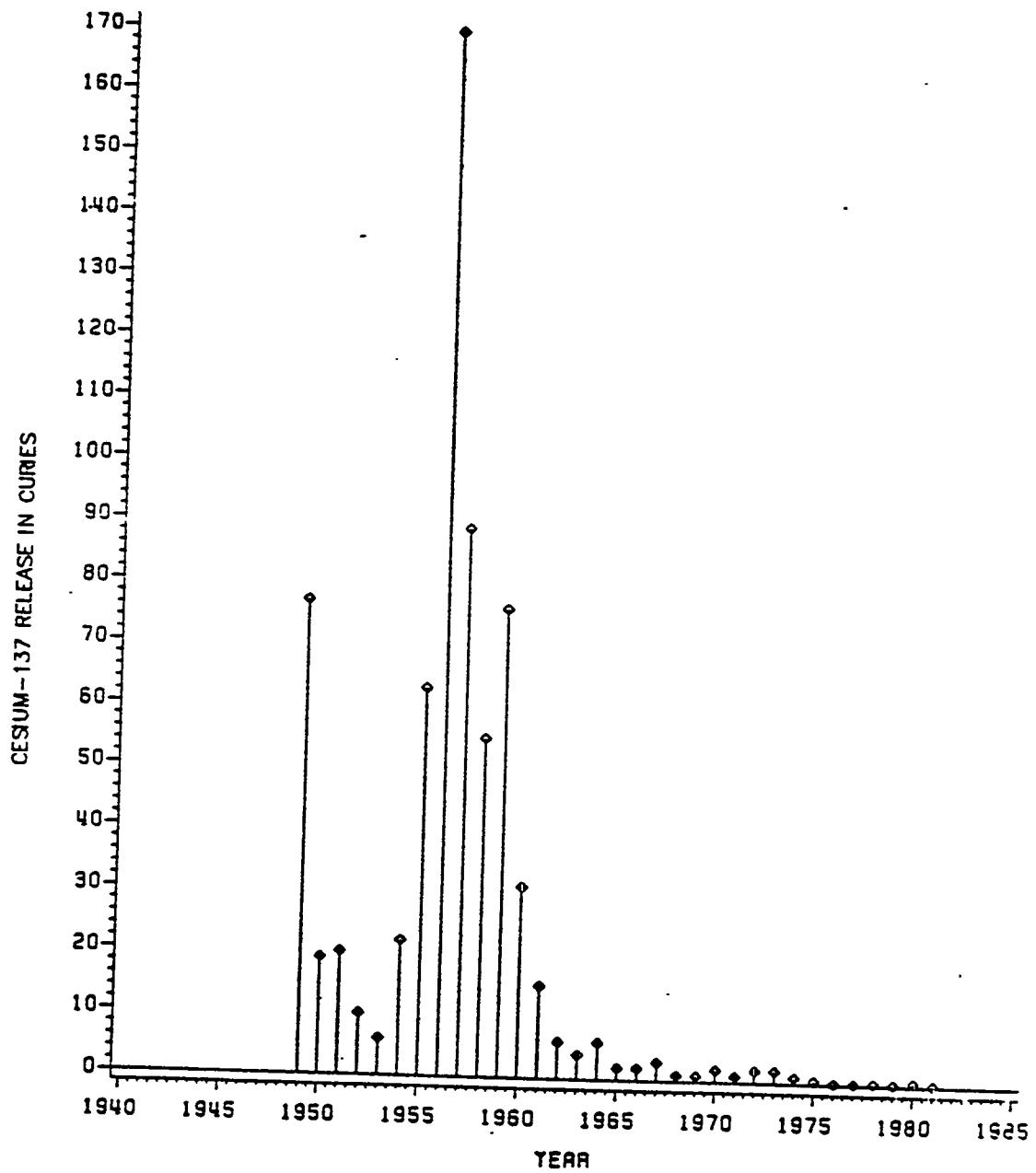


Fig. 6.10. Annual cesium releases from White Oak Lake.

Additional coring of Watts Bar Lake and Chickamauga Lake (downstream of Watts Bar) will be undertaken to estimate the total quantity of mercury contained in sediment in these reservoirs.

6.5.12 Assessment of Health Risk in Consuming Fish Contaminated With Mercury

Objective evaluation of the fish data for East Fork Poplar Creek requires consideration of both the observed concentrations of mercury in fish taken from East Fork Poplar Creek and the eating habits of people potentially consuming fish from these waters. The FDA action limit of 1.0 $\mu\text{g/g}$ (ppm) in edible fish flesh is based on a large body of evidence that indicates that an individual may consume over a lifetime up to 30 g (~1 oz) of fish per day containing 1 ppm methylmercury without endangering his/her health. This action limit contains a safety factor of 10, which means that 10 times as much fish with 1 ppm mercury could be consumed before symptoms of chronic methylmercury poisoning would be expected. Surveys of the eating habits of Americans have indicated that, on the average, fish consumption amounts to about 20 g/d (<1 oz/d). Thus a person with average fish-eating habits would be afforded the maximum benefit of the safety factor built into the FDA action limit. Concern is thus focused on the atypical individual who consumes excessive quantities of fish, for example, 15 times the national average or 300 g/d (2/3 lb/d). Clearly the health of this individual would likely be affected by consistently consuming fish with 1.0 $\mu\text{g/g}$ mercury.

In the context of the East Fork Poplar Creek situation, one may reasonably ask whether the edible fish population is large enough to sustain the appetite of one atypical individual or family. At this time, no quantitative surveys of edible fish populations in East Fork Poplar Creek have been undertaken, but quantitative estimates have been made (Ref. 23). If one assumes that the aquatic habitat of East Fork Poplar Creek is similar to that of Steeles Run, Kentucky, where quantitative estimates of the bluegill population have been made, then a possible upper limit on the bluegill population (cited in Ref. 23.) in East Fork Poplar Creek would be about 30 kg/ha (16 lb/acre). The average width of the upper section of East Fork Poplar Creek is about 3.5 m (11.5 ft) (cited in Ref. 23), with ~5.6 ha (23 acres) of stream surface area in the upper portion of East Fork Poplar Creek where mercury concentration in sport fish is highest. The total population of bluegill, including all sizes, would thus be 168 kg (370 lb). The atypical consumer of fish (300 g/d) would exhaust this population in less than two years (560 days) if fish reproduction and growth rates were zero. Daily consumption would initially be only about 0.2% of the total weight of the fish population; it is reasonable to expect the bluegill population to supply the consumer for a much longer period if reproduction and growth are taking place. This analysis represents a worst-case scenario by assuming a high consumer obtains all the fish consumed from the East Fork Poplar Creek, but it illustrates the fact that a human health risk associated with consuming large quantities of fish from East Fork Poplar Creek is possible, especially if the fish

had average mercury concentrations in excess of 1 ug/g. However, in the absence of actual data on the size of fish populations in East Fork Poplar Creek, the probability of an individual reaching a fish consumption level constituting a health risk cannot be reliably established.

6.6 ASSESSMENT OF CURRENT MERCURY DISCHARGES FROM Y-12

6.6.1 Air

Based on current data, present mercury loss to the atmosphere from the Y-12 Plant is negligible. There is continuing interest, however, in appraising the health of employees working in buildings that had previously contained mercury process equipment, particularly in Building 9201-4, which still contains Colex process equipment. Past experience in Buildings 9201-5, 9204-4, and 9201-2 indicates that typical mercury-in-air concentration levels in these buildings lie consistently well below the TLV, and routine monitoring is unnecessary since the Colex/Elex process equipment has been decommissioned and removed. Since 9201-4 still contains process equipment, routine monitoring will continue until after the equipment has been removed.

6.6.2 Water

6.6.2.1 East Fork Poplar Creek

The effluent of New Hope Pond flows into East Fork Poplar Creek. In addition to monthly composites of weekly samples from the effluent of New Hope Pond, weekly grab samples have also been taken since December 1977. The latter sampling method was undertaken as a result of Recommendation 4 of the 1977 Elwood study. Mercury concentration and mercury discharge for both grab and composite samples are summarized in Table 6.4. These data indicate a relatively constant mercury concentration and discharge since 1977. The data also indicate consistent differences between the grab samples and the composite samples. Composite data for both concentration and discharge are lower than the grab sample data for all years except 1983. Both data sets should reflect the influence of storms occurring at the time of sampling (grab) or during the compositing period. During major storm events, resuspension of solids in storm drains and ditches occurs during the rising water phase of the storm, followed by downstream transport into New Hope Pond and East Fork Poplar Creek. Accurate estimation of quantities of material released during storm events would require samples to be taken at regular intervals during the rising and falling stages of the storms. Thus far, a systematic evaluation of the effect of storms on mercury concentration and discharge has not been made. A few grab samples taken recently during high flows (>10 Mgd) have indicated higher mercury concentrations (up to 9 ug/L) and higher instantaneous mercury discharges (up to several hundred grams per day) than what would occur during normal flow conditions.

Table 6.4. Summary (mean \pm SD) of weekly grab sample and monthly composite sample data for mercury in New Hope Pond effluent (NPDES station)

Year	Mercury concentration ^a ($\mu\text{g/L}$)		Mercury discharge (g/d)	
	Grab	Composite	Grab	Composite
1977	3.2 \pm 0.4	0.5	43 \pm 20	13
1978	1.6 \pm 1.1	0.9 \pm 0.6	31 \pm 21	28 \pm 26
1979	1.6 \pm 0.9	1.3 \pm 1.3	46 \pm 33	39 \pm 41
1980	1.8 \pm 1.0	1.0 \pm 0.8	53 \pm 27	30 \pm 24
1981	1.4 \pm 0.9	1.1 \pm 0.6	40 \pm 30	30 \pm 16
1982 ^b	1.6 \pm 0.8	1.3 \pm 1.8	55 \pm 50	47 \pm 62
1983 ^c	0.7 \pm 0.4	0.7 \pm 0.7	23 \pm 13	25 \pm 9.3

^aConcentration values reported as <1 $\mu\text{g/L}$ were assumed to be equal to 0.5 for the purpose of calculating averages.

^bOne outlier value (40 $\mu\text{g/L}$ concentration, >50 Mgd flow) excluded.

^cData through April 18, 1983, only.

A few grab samples have been collected and filtered (0.45 micron filter) to determine whether mercury released from New Hope Pond was soluble or insoluble. In all cases, mercury concentrations in the filtrate (soluble) were less than the detectable limit (0.1 $\mu\text{g/L}$), indicating that mercury is being discharged predominantly (>90%) in suspended (insoluble) form.

Overall, the monitoring data for the last seven years indicate that an amount ranging from about 20 to 50 lb of mercury (0.8 to 2 oz/d) is being discharged annually with typical water concentrations in the range of 1 to 2 $\mu\text{g/L}$. Instantaneous mercury loading of East Fork Poplar Creek appears to increase during storms, but an accurate assessment of the net effect of storms on mercury loading has not been made.

The average grab sample concentration is higher than the composite and is felt to be more correct since those samples are preserved with acid. But the flow data used for the composite are more representative of stream flows since those samples are taken with a flow-proportional device. The overall average mercury discharge (grab) from Table 6.4 for the last seven years shown computes to be 41.6 g/d or 1.47 oz/d or 33.5 lb/year or 1.12 L/year.

6.6.2.2 Bear Creek

No mercury has been found in the water of Bear Creek over the years, but it has been detected in crayfish (Sanders 1970 Study - 0.16, 0.22, and 0.78 ppm) and in sediment samples (Van Winkle 1982 Study - 13 ppm, see Sect. 6.6.3.3). It is of interest to note that the Sanders Study looked at four Bear Creek fish, and all were below 0.1 ppm. In the summer of 1983, a groundwater sample taken in an excavation west of the S-3 ponds, but a little east of the Bear Creek headwaters, showed a mercury concentration of about 1,000 ppb. This finding spurred another search for mercury use at Y-12 which might explain the presence of mercury in the Bear Creek headwaters or sediments. A usage was revealed which can account for the past findings (1970 Sanders, 1982 Van Winkle, 1983 groundwaters, etc.).

Small quantities of mercuric nitrate are used as a catalyst for dissolution of aluminum-uranium alloy in the Special Processing area of the Chemical Services Department in Building 9212. The nitric acid without this catalyst tends to passivate the alloy surface by forming an insoluble oxide. Other catalysts have been investigated; however, none have yet been found effective.

This catalyst was first used in the mid 1950s to the early 1960s. In July 1982, the process was resumed. The alloy dissolution process is run in a batch operation mode. Mercuric nitrate usage has run about 400 g per month for the last year.

The acid solution, with the mercuric nitrate catalyst, is processed to recover the enriched uranium metal and the mercuric nitrate catalyst is ultimately discharged from the process as raffinate waste stream. The raffinate is either processed in the biodentrification facility or disposed of in the S-3 ponds. Sludge from the biodentrification facility is also disposed of in the S-3 ponds.

The S-3 ponds were built in 1951 to dispose of waste acid by percolation into the groundwater and evaporation. The ponds work well as originally designed; however, this method of disposal is no longer environmentally acceptable. Groundwater from the ponds enters Bear Creek and apparently is responsible for the mercury found in sediments near the ponds that were sampled in the 1982 Van Winkle Study. Mercury has not been detected in either the surface water in Bear Creek or the groundwater monitoring wells downgradient of the S-3 ponds. Recent construction to the west of the S-3 ponds penetrated a zone saturated with leachate from the S-3 ponds, and mercury concentration in this leachate was ~1.0 ppm.

6.6.3 Soils and Sediments

6.6.3.1 Surface and Subsurface Mercury Within the Y-12 Plant Boundaries

Much of the original topography was altered during the construction of the Y-12 Plant through the movement of excavation and fill materials so that few buildings were entirely built on the original ground. During the construction process, the natural course

of Bear Creek was altered, and a big natural spring, southwest of Building 9201-2, which was probably the original headwaters of East Fork Poplar Creek, was plugged. The impact of unconsolidated fill materials on the natural water courses is difficult to estimate without extensive study. It is not presently known: (1) what effect the groundwater within the plant has on transporting spilled contaminants or (2) what the potential is for spilled mercury to be retained in pockets between the natural ground and fill zones.

Available reports indicate that mercury did not diffuse uniformly through the shale. Instead, it appears to be confined to backfill material or disturbed shale.

The most probable location of mercury accumulations is in permeable zones in the fill and open fractures or solution cavities in bedrock. Partially decomposed or fresh shale will act as a barrier to mercury migration except where it is cut by fractures. The planned drilling program will be designed to attempt to take advantage of fractures, solution cavities, preexisting topography, test-hidden depressions, and old valleys beneath and adjacent to facilities and spill locations, as well as intersecting fractures and voids.

More will be known about subsurface mercury retention and its impact on groundwater upon completion of the Y-12 Plant subsurface mercury investigation.

6.6.3.2 Sediments Within the Y-12 Plant

Within the Y-12 Plant, there are two locations where the sediments are contaminated with mercury. These are: (1) sediments in New Hope Pond and (2) sediments dredged from New Hope Pond in 1973 and deposited in the dredging spoils basin on top of Chestnut Ridge (Table 6.5 and Fig. 6.11). A minor source of mercury-contaminated sediments is that found in the Van Winkle (Ref. 21) sampling of the headwaters of Bear Creek within the Y-12 Plant (see Fig. 6.12, Sample Location 6 - 13 ppm).

Sediment in New Hope Pond (Ref. 21)

Table 6.5 summarizes the results of total mercury analyses in sediment layers from New Hope Pond. Mercury values are given on a dry weight basis but can be converted to a wet weight basis if desired, using the "percent moisture" values also given in the table. Displaying these data graphically reveals a pattern of generally increasing mercury concentration as depth in the core increases, with a superimposed broad peak in concentration 25 to 45 cm below the surface (Fig. 6.11). The shape of the mercury profile below 55 cm is incomplete because only alternate 5-cm-thick layers were analyzed. However, the mercury concentration in the 80- to 85-cm layer (293 $\mu\text{g/g}$) is believed to be most representative of the oldest sediment in the pond. Both deeper layers (85-90 and 90-95 cm) contained intermixed gravel and tan clay and showed no structures (i.e., distinct strata) suggestive of undisturbed sedimentation through water. In contrast, the layers between 60 and 85 cm contained distinct strata rich in

Table 6.5. Total mercury concentration of New Hope Pond sediment layers. Core collected May 5, 1982, from central area of pond

Sample code	Interval (cm)	Percent moisture ^a	Total Hg (ug/g-dry wt.)
NHP-1	0-5	80	107
NHP-2	5-10	68	108
NHP-3	10-15	64	116
NHP-4	15-20	70	110
NHP-5	20-25	68	122
NHP-6	25-30	61	174
NHP-7	30-35	54	240
NHP-8	35-40	59	220
NHP-9	40-45	47	278
NHP-10	45-50	52	170,166 ^b
NHP-11	50-55	46	159
-	55-60	45	c
NHP-13	60-65	43	220
-	65-70	43	c
NHP-14	70-75	54	302
-	75-80	48	c
NHP-15	80-85	47	292
-	85-90	30	c
-	90-95	27	c

^a(Wet weight - dry weight)/wet weight.

^bResults of duplicate analyses.

^cSample not analyzed.

ORNL-DWG 82 13350

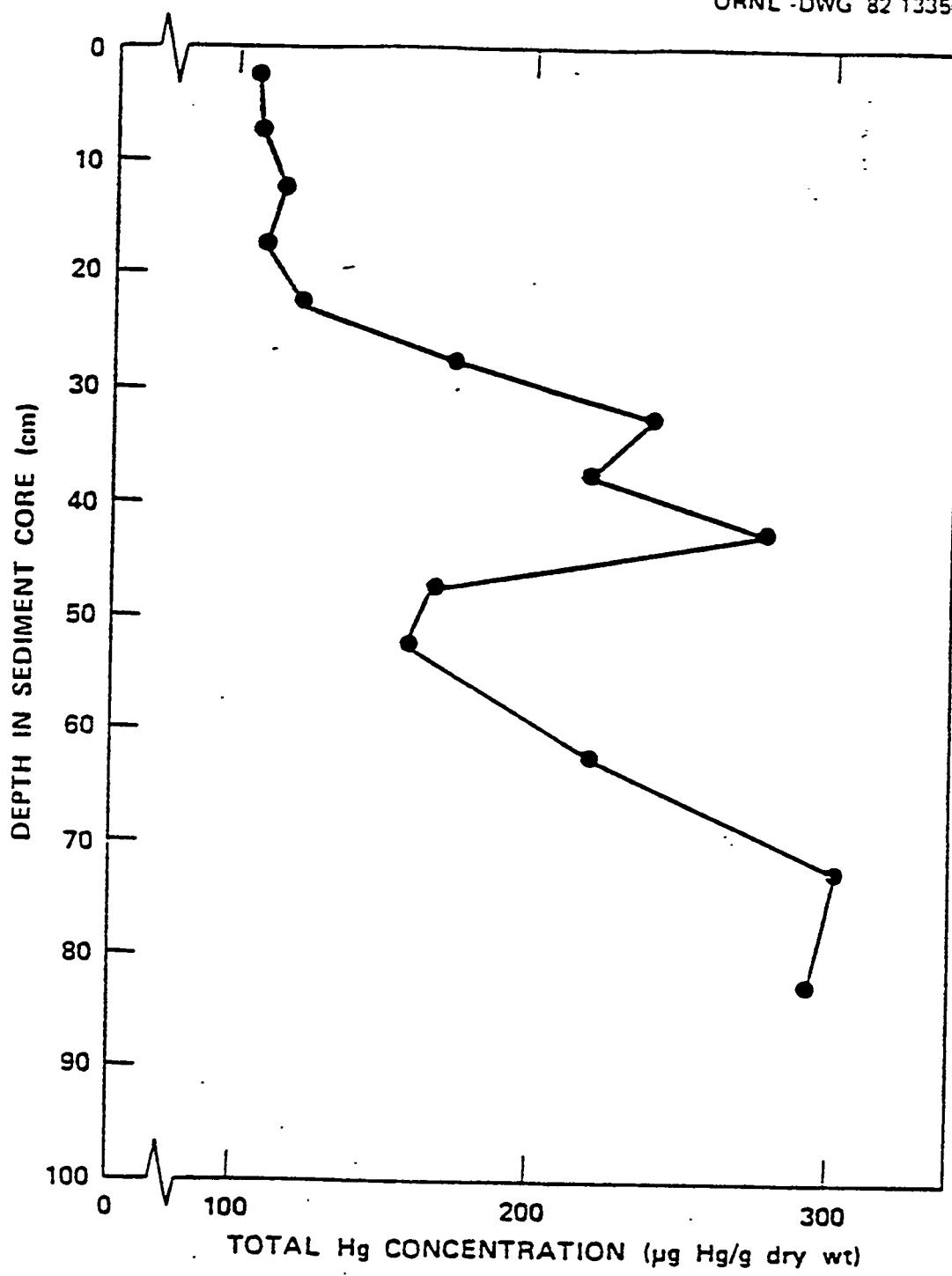


Fig. 6.11. Total mercury concentration as a function of depth in the sediment core taken from New Hope Pond in May 1962.

coarse organic debris (probably from aquatic plants) alternating with fine-grained mud. This pattern of layering is characteristic of seasonal or shorter cycles of sediment deposition. Significant runoff events lay down the mud layers, whereas growth of aquatic plants during warmer months and between periods of storm-turbidity-induced growth inhibition accounts for the organic debris layers. Such alternating layers were absent from or not visible in the upper 60 cm of the core, which was also devoid of other sedimentary structures. The absence of such structures generally suggests continuous active mixing of the upper few centimeters of sediment by wave action and/or burrowing organisms.

In the context of the question concerning temporal changes in the input of mercury to New Hope Pond, the core results suggest that mercury input has decreased since the last major dredging (1973). Stated more precisely, comparison of mercury concentrations in the youngest (0- to 5-cm layer) and oldest (80- to 85-cm layer) sediments in New Hope Pond suggests that mercury levels in sediment washing into New Hope Pond have decreased from about 300 to 100 $\mu\text{g/g}$. However, the broad peak in mercury concentrations between 25 to 45 cm (Fig. 6.11) suggests that the mercury concentration in sediment entering the pond has varied appreciably since the last major dredging, which precludes an unambiguous interpretation of the core results. Organic mercury was analyzed for New Hope Pond Samples 3, 6, and 13 (Ref. 24). Organic mercury concentrations were 0.04, 0.06, and 0.11 mg/L, less than 1% of total mercury in each sample. A question has been raised as to whether the deeper sediments (65-95 cm) may have been residual material left behind in the 1973 dredging operation. This has not been resolved (Ref. 25).

Recent sediment samples have been taken from New Hope Pond for the purposes of determining whether the sediment is a hazardous waste under RCRA by virtue of the Tennessee EP Toxicity Test. The results of these samples, with respect to mercury, are presented in Table 6.6.

Table 6.6. Results, EP toxicity test, New Hope Pond sediment

Sample req. no.	Sediment ($\mu\text{g/g Hg}$)	Leach data (mg/L Hg)
119090	57	<0.01
119091	110	<0.01
119092	160	<0.01
119093	150	<0.01
119094	120	<0.01
119095	160	<0.01
119096	94	<0.01

(Samples taken and analyzed May 1983.)

These tests demonstrated that the sediment would not be classified as a hazardous waste based on the EPA toxicity test with respect to mercury because the leach results were less than the 0.2 mg/L criterion in the regulations.

Chestnut Ridge sediment disposal pit

Sediment from the 1973 dredging operation was disposed of in a pit located on Chestnut Ridge. Since 1974, sediments collected from the annual dredging of the dispersion ditch on the south side of the pond, the oil skimmer upstream of the pond, and the industrial ditch adjacent to the dam have been placed in this pit. In 1980, a narrow strip of New Hope Pond near the aerator was dredged and the spoils placed in this pit. In May 1983, samples, primarily of the recently deposited sediments, were collected and tested using the EP Toxicity Test.

The results, shown in the following table, show that these samples would not be classified as toxic based on the EPA toxicity test with respect to mercury.

<u>Sample req. number</u>	<u>Sediment ($\mu\text{g/g Hg}$)</u>	<u>Leach data (mg/L Hg)</u>
119104	110	<0.01
119105	130	<0.01
119106	110	<0.01
119107	140	<0.01

6.6.3.3 Sediments in Bear Creek

The 1982 Van Winkle Study included this statement: "The Y-12 Plant area does not appear to be a significant source of mercury for Bear Creek sediments. Although mercury concentration in fine-grained sediment from the headwaters is elevated by a factor of ~40 over natural background concentration, downstream sediment contained essentially background concentration of mercury" (Ref. 21).

Sediment data from Bear Creek and East Fork Poplar Creek are presented in Table 6.7. Figure 6.12 shows the sampling locations for these studies. Table 6.8 describes the sampling points.

Table 6.7. Total mercury concentration in sediment (<0.125-mm size fraction) for sampling sites in East Fork Poplar Creek, Bear Creek, and tributary creeks used as control sites

Station number	RK (RM) ^a	Total Hg ($\mu\text{g/g}$ dry wt.)
<u>East Fork Poplar Creek</u>		
1	2.1 (1.3)	19
2	7.7 (4.8)	32
4	10.9 (6.8)	30
5	13.4 (8.3)	55
6	22.2 (13.8)	127
7	22.7 (14.1)	62, 62 ^b
8	22.8 (14.2)	90
<u>Bear Creek</u>		
1	0.6 (0.4)	0.12
3	4.5 (2.8)	0.33, 0.48 ^b
4	9.7 (6.0)	1.7
5	11.4 (7.1)	1.3
6	12.2 (7.6)	13.0
<u>Control</u>		
1	-	0.31
2	-	0.26, 0.29 ^b

^aRiver kilometer (rivermile) relative to confluence with Poplar Creek for East Fork Poplar Creek and relative to confluence with East Fork Poplar Creek for Bear Creek.

^bDuplicate analyses.

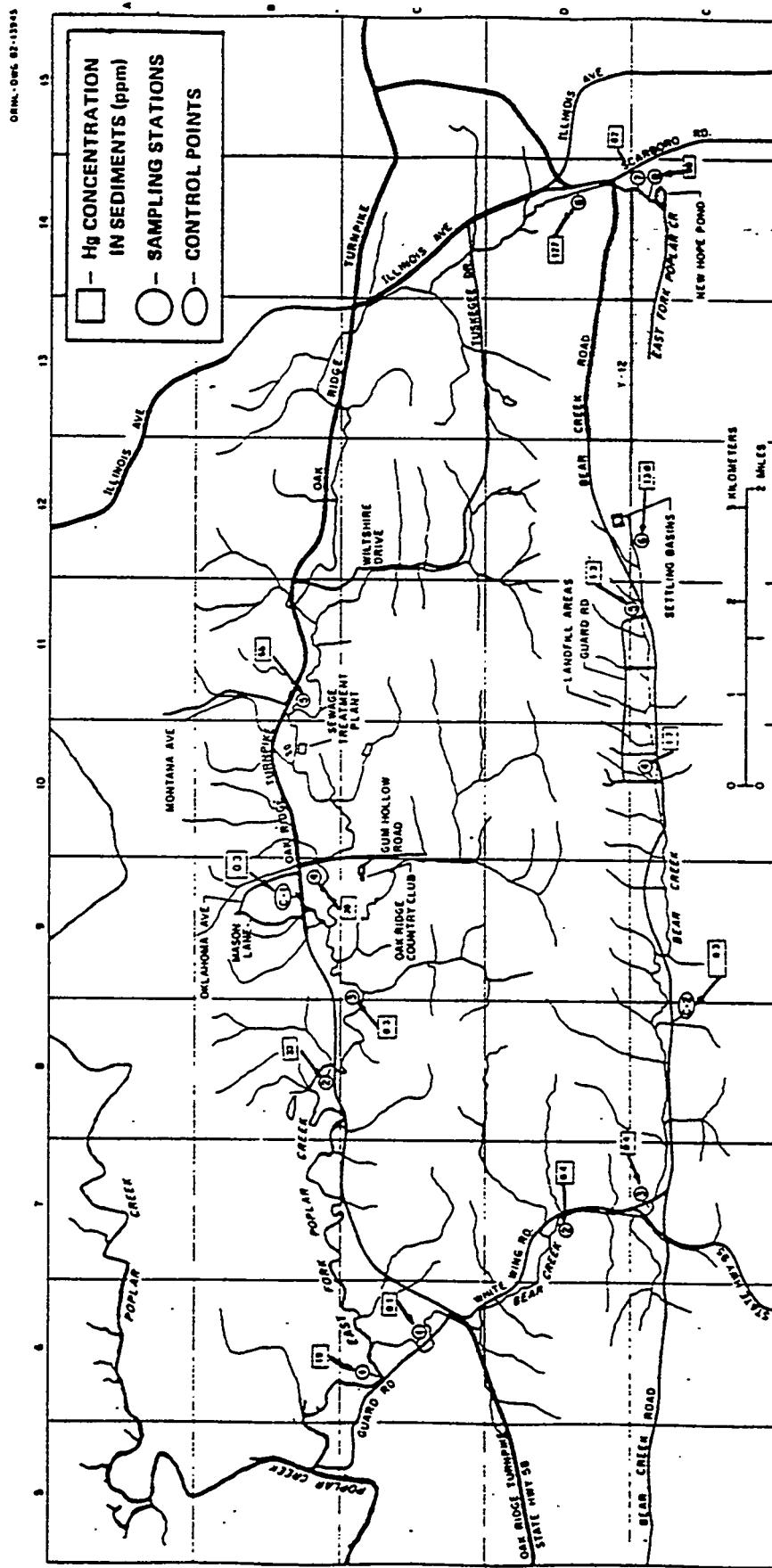


Fig. 6.12. Location of sampling stations on East Fork Poplar Creek and Bear Creek.

Table 6.8. Location and description of sampling sites in East Fork Poplar Creek, Bear Creek, and tributary creeks used as control sites (see Fig. 6.12)

Station number	Site description	RK (RM) ^a	Grid quadrant ^b
<u>East Fork Poplar Creek</u>			
1	Approximately 500 m downstream of confluence with Bear Creek	2.1 (1.3)	C-6
2	Downstream of Route 95 bridge-crossing	7.7 (4.8)	B-8
4	Downstream of Gum Hollow Road bridge-crossing (adjacent to Oak Ridge Country Club)	10.9 (6.8)	B-9
5	Immediately south of the intersection of Montana Avenue and the Oak Ridge Turnpike	13.4 (8.3)	B-11
6	West of old guard house on Scarboro Road 500 m north of Bear Creek Road intersection with Scarboro Road	22.2 (13.8)	D-14
7	Approximately 100 m downstream of the large storm water inlet mentioned for Station 8	22.7 (14.1)	E-14
8	Between New Hope Pond discharge point and first large stormwater inlet on west bank approximately 50 m downstream	22.8 (14.2)	E-14
<u>Bear Creek</u>			
1	Downstream of third bridge (counting from Route 95) across Bear Creek on Gravel Guard Road northeast of McKinney Ridge near USGS Bench Mark BM LK 90	0.6 (0.4)	C-6
3	At permanent NPDES monitoring station near intersection of Bear Creek Road and White Wing Road	4.5 (2.8)	E-7
4	Upstream of westmost gate to landfill areas on north side of Bear Creek Valley Road	9.7 (6.0)	E-10

Table 6.8. (Continued)

Station number	Site description	RK (RM) ^a	Grid quadrant ^b
<u>Bear Creek (continued)</u>			
5	Upstream of eastmost gate to landfill areas on north side of Bear Creek Valley Road	11.4 (7.1)	E-11
6	Approximately 200 m west of settling basins at the west end of the Y-12 Plant	12.2 (7.6)	E-12
<u>Control</u>			
1	Tributary to East Fork Poplar Creek downstream of spring on north side of Oak Ridge Turnpike between Oklahoma Avenue and Mason Lane	-	B-9
2	Tributary to Bear Creek at Bear Creek Road crossing west of power line right-of-way, originating on north slope of Chestnut Ridge	-	E-8

^aRiver kilometer (rivermile) relative to confluence with Poplar Creek for East Fork Poplar Creek and relative to confluence with East Fork Poplar Creek for Bear Creek.

^bFrom Topographic Map S-16A (1974) of the Oak Ridge area.

6.6.3.4 Sediments in East Fork Poplar Creek (Ref. 21)

Data on contaminant concentrations in river sediment can be very difficult to interpret if samples have not been collected with a specific purpose in mind or if supplemental information regarding other properties of the sediment is not available.

Numerous studies have demonstrated an inverse relationship between mercury concentration in sediment and sediment particle size [i.e., fine-grained sediments (muds) exhibit higher concentrations than coarse-grained sediments (sand, gravel)]. In addition, among sediments with similar particle size distribution, those having higher organic matter concentration are typically also higher in mercury concentration. This preferential enrichment of mercury on smaller particles and on organic matter is thought to arise because of both surface area phenomena and the chemical affinity of mercury for organic matter.

A sediment size fraction was selected that (1) is most subject to erosion, transport, and dispersion downstream of the plant area and (2) is most likely to contain the highest concentration of mercury. Fine sand-sized (0.063 to 0.125 mm), silt-sized (0.004 to 0.063 mm), and clay-sized (<0.004 mm) sediments constitute the largest portion of the total bed sediment in a stream that is subject to continuous downstream transport. Coarser material (coarse sand, gravel) is transported only under relatively infrequent storm flow conditions. Thus an active point source of mercury-contaminated sediment is more likely to be located by analysis of fine-grained sediment collected along the axis of a stream than by analysis of either bulk sediments or the coarse fractions thereof.

Fine-grained sediment is the best candidate because (1) fish tend to preferentially ingest (passively or actively) fine-grained sediment in their feeding and (2) prey organisms such as aquatic insects and snails are often in intimate contact with, or ingest, fine-grained sediment. Consequently, the accumulation of mercury by fish would not be expected to vary with the concentration of mercury in bulk sediment but rather with the mercury concentration in the sediment fractions to which they are directly and indirectly most exposed.

Mercury data for East Fork Poplar Creek and Bear Creek sediments are given in Table 6.7, and data for East Fork Poplar Creek are displayed graphically as a function of distance downstream from New Hope Pond in Figure 6.13. The East Fork Poplar Creek data reveal a generally decreasing mercury concentration in <0.125-mm sediment with increasing distance downstream from the pond (at RK 23.0). The highest value (127 µg/g) at Station 6 may reflect a somewhat higher clay or organic matter content at this site than those at the upstream sites that were relatively devoid of any fine-grained sediment because of a higher flow velocity through the uppermost reaches of East Fork Poplar Creek. The site at Station 6 was deliberately chosen for sampling because it was a more likely site for deposition of fine-grained sediment than the two sites immediately downstream of New Hope Pond. Not surprisingly, fine-grained sediments from all three of the upstream sites were similar in mercury concentration to the surface sediments in New Hope Pond. This observation suggests that New Hope Pond is the source of these downstream sediments.

The decrease in mercury concentration in sediment down the 23-km length of East Fork Poplar Creek is consistent with the existence of a sustained source of mercury in the headwaters of East Fork Poplar Creek and with downstream dilution by mixing with uncontaminated sediment. Losses of mercury from sediment by volatilization of elemental or methylmercury may also contribute to the downstream decrease, but this effect is likely to be minor compared with dilution by mixing with uncontaminated sediment.

As discussed for New Hope Pond, the mercury concentration in sediment from all sampling sites on East Fork Poplar Creek exceeds natural background levels by factors of 60 or more. The control sample (C-1, Table 6.8) collected in a tributary to East Fork Poplar Creek

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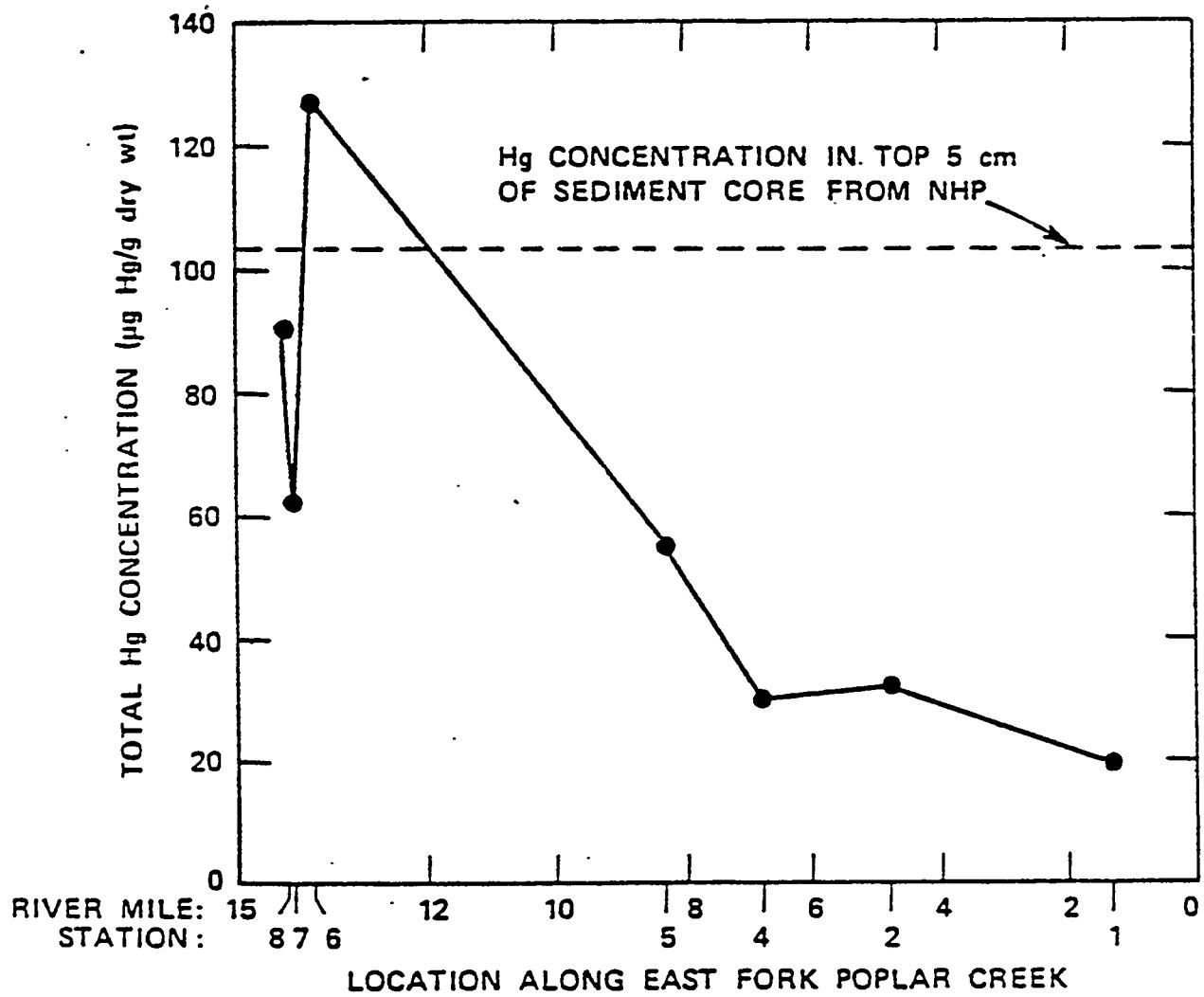


Fig. 6.13. Mercury concentration in sediment in East Fork Poplar Creek as a function of distance downstream from New Hope Pond.

gives some indication of the local natural background level for mercury (0.31 ug/g) and further demonstrates that the high mercury levels in East Fork Poplar Creek are not the result of a locally high natural background value for mercury in stream sediments.

6.6.4 Current Sources and Discharges of Mercury in Drainage Waters of the Y-12 Plant

As discussed previously (Sect. 6.6.2.1), recent monitoring data for the NPDES site at New Hope Pond reveal mercury concentrations in the discharge that are typically 1 to 2 $\mu\text{g/L}$ (ppb). When multiplied by the typical daily water discharge at this site (8 million gal/d), these concentrations yield a daily mercury discharge in the range of 30 to 60 g/d (~1 to 2 oz). For example, over the two-year period 1981-1982, the average daily discharge was 39 g.

Prior to October 1982, the specific location and magnitude of the sources of mercury contamination within the Y-12 Plant had not been rigorously determined. It was assumed that the recent losses of mercury in drainage waters could be traced to the drainage systems associated with the buildings that formerly (1950 to 1963) contained large quantities of mercury. Specifically, Building 9201-4, which had not been stripped and decontaminated, was suspected to be the main source. Although this building is currently in standby status, a small amount of water continues to flow through the sumps and into East Fork Poplar Creek. It was also assumed that sediments in New Hope Pond were a contributing source of the mercury being discharged into East Fork Poplar Creek.

In October 1982, a comprehensive investigation was initiated to identify all significant sources of mercury. Mercury concentration and water flow rates have been measured at numerous points within the Y-12 Plant in order to develop a detailed mass balance. The product of mercury concentration and water flow rate gives mercury loading rate, and thus the relative contribution of each source can be determined.

The initial efforts were to determine variability in mercury loading rates over a typical 24-h weekday period. Seven pipes discharging into the industrial ditch, plus the inflow and outflow of New Hope Pond, were sampled at 4-h intervals. The inflow and outflow of New Hope Pond, and all but one of the pipes sampled, showed only small variations ($\pm 25\%$) in mercury loading over the 24-h period. Mercury loading for one pipe behind 9201-4 increased from about 3 g/d to about 20 g/d for a brief period (less than 4 h), apparently when a sump pump was activated. During this period, the mercury loading in the inflow to New Hope Pond was $128 \pm 16 \text{ g/d}$, while the outflow was $67 \pm 13 \text{ g/d}$. Thus about 50% of the mercury carried into New Hope Pond in drainage waters was retained by the pond.

In December 1982, a comprehensive sampling of all accessible discharges leading into the industrial ditch, including the underground portion, was conducted. This survey included a total of 47 sampling points upstream of New Hope Pond, plus the inflow and outflow of New Hope Pond. Results are summarized in Figure 6.14. During this sampling period, the input of mercury to New Hope Pond was 146 g/d.

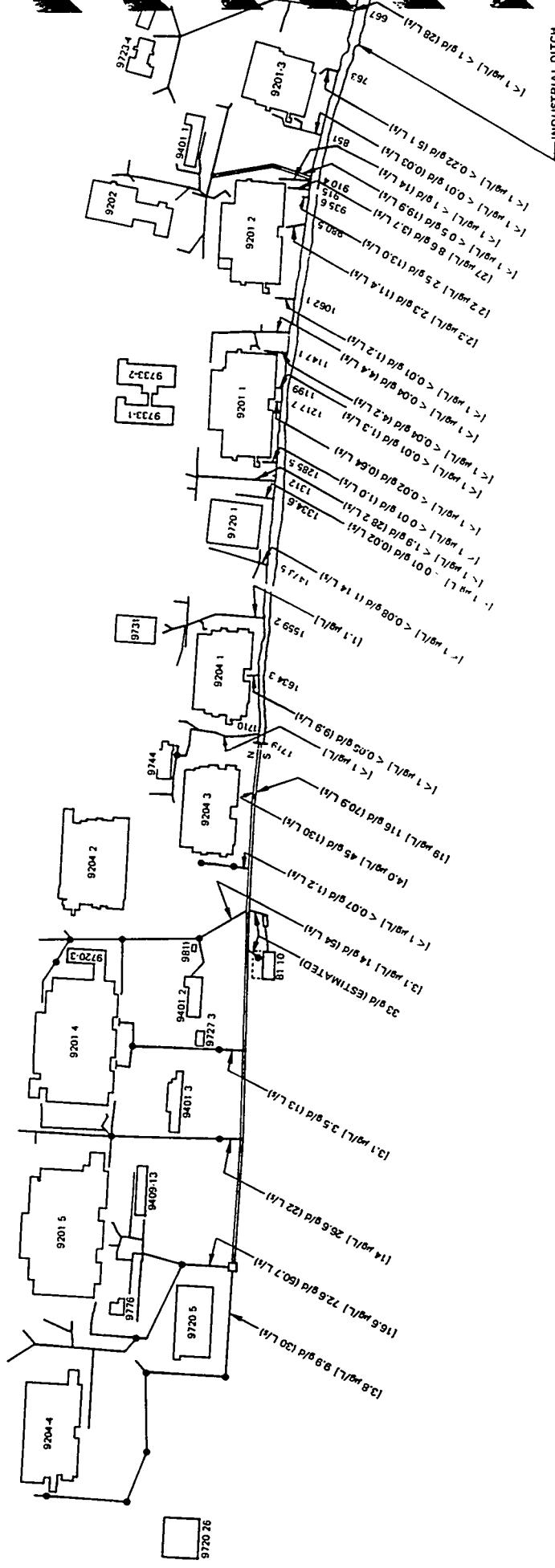


Fig. 6.14. Mercury drain line sampling program - December 8-10, 1982.

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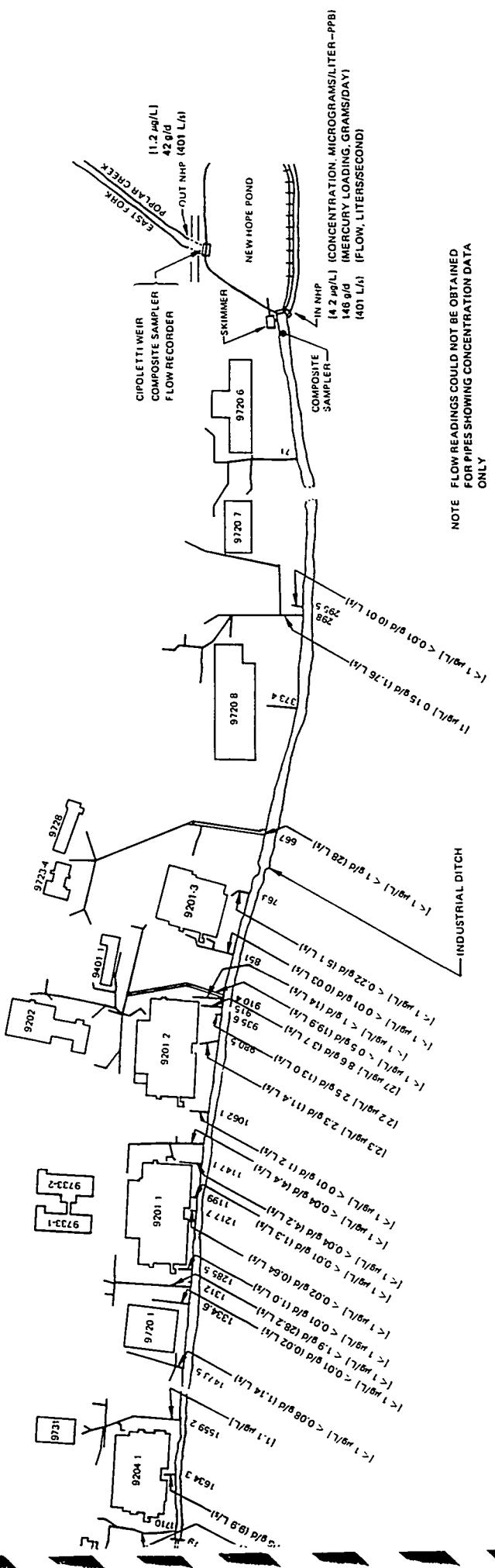


Fig. 6.14. Mercury drain line sampling program - December 9-10, 1982.

Upstream discharges (totaling ~174 g/d) to the industrial ditch more than accounted for the measured input to New Hope Pond, suggesting some temporary accumulation (sedimentation) of mercury in the industrial ditch. The New Hope Pond data (based on one grab sample each day) suggest that about 70% of the input mercury was retained by the pond.

The drain line sampling conducted in December 1982 provided a "snapshot" picture of the location and magnitude of the mercury releases. An analysis of the data indicates that most of the mercury is coming from the old production buildings. The drainage pipes from Buildings 9204-4 and 9201-5 contribute about 47% (38 g/d), the pipes from 9201-4 contribute about 25% (44 g/d), and those from 81-10 contribute about 19% (33 g/d), and the pipes from 9201-2 contribute about 8% (13 g/d) of the mercury released through the drainage system at that time. Debris and sediments were observed in some of the drain lines, particularly behind security gratings. In the drainage lines behind the old process buildings, some metallic mercury was observed at the time of sampling, trapped in the bell joints in drain pipes and in junction boxes. Buildings 9201-5, 9201-4, and 81-10 were inspected and found to contain metallic mercury as well as sludges suspected of being contaminated with mercury. Buildings 9204-4 and 9201-2 did not show visible evidence of mercury.

As the result of the drain line survey and the subsequent visual inspections, the following recommendations were made: (1) installation of temporary dams in the industrial ditch to allow settling of the larger solid particles that may become suspended during cleanup operations; (2) cleanup of the fan rooms and sumps of Buildings 9201-4 and 9201-5; (3) cleanup of the 81-10 area; (4) inspection and cleanup of Building 9201-2; (5) cleanup of major drain lines showing the higher mercury release rates; and (6) investigation of possible rerouting of drain lines in Building 9201-5 to reduce water flows through sumps.

The primary responsibility for implementing these recommendations was assigned to the Metal Preparation Division. The Metal Preparation Division had considerable experience in prior years with other mercury cleanup programs and activities. The follow-up activities began in March 1983 with the installation of the temporary dams in the industrial ditch followed by cleanup of the 81-10 area. The feasibility of rerouting drain lines in Building 9201-5 was investigated, and it was determined that this would be difficult to accomplish at this time. Cleanup of the fan rooms and sumps in Buildings 9201-4 and 9201-5 is proceeding. Sludges and sediments collected to date have been packaged in lined steel drums and are being stored awaiting disposal.

Upon completion of the cleanup in Buildings 9201-4 and 9201-5, cleanup activities will be started in Buildings 9201-2, as well as in the drain line systems.

Prior to initiating any cleanup activities, it was recognized that these operations could disturb settled sludges and fine-grained sediments in the drainage system, which might temporarily increase the mercury release rate from the drainage system in the Y-12 Plant. Cleanup plans were developed and modified in an attempt to minimize the mercury release rate. Since New Hope Pond was shown to work fairly

effectively as a settling basin in nonstorm periods, it was anticipated that any increase in mercury release from the Y-12 Plant would be no worse than the impact caused by storms.

This drain line survey conducted in December 1982 provided the focus for the corrective actions currently under way. It provides one set of data points (i.e., an "instantaneous picture" of the mercury discharges from the Y-12 Plant). This set of data, however, does not provide a complete characterization of mercury releases from the Y-12 Plant drainage system. Additional sampling is needed to better characterize the drainage system and understand current mercury release rates. Since the initial sampling provided a consistent picture of where mercury was being released, it was decided to postpone additional sampling of the drain lines until after this present cleanup activity is completed.

Further sampling will provide a basis for estimating the impact of the cleanup and identify the need for additional corrective action programs. It will also allow for better estimates of mercury release rates from the plant drainage system, as well as New Hope Pond. The relative impact of storms on mercury release needs better definition to complete the characterization of mercury release from the Y-12 Plant draining system. Additional storm data will be collected to characterize this impact. Drain line survey work is expected to continue until it is demonstrated that sources of mercury have been adequately cleaned up or contained. Routine monitoring will then follow.

6.6.5 Y-12 Plant Subsurface Mercury Investigation

Around each of the approximately eight facilities that handled substantial quantities of mercury and major spill locations, geologic investigation reports and preexisting topographic data will be reviewed. Drill holes will be located to intersect fill areas, fractures, and solution channels. Stations will be located approximately on a grid biased toward significant features. Where data from cores are not present, drilling will be conducted to identify fractures or solution channels. Where feasible, portable drilling equipment will be used to core beneath buildings to seek accumulations beneath foundations. In general, drilling in buildings will be very difficult because of space considerations. Drilling outside buildings will be influenced by utilities and other structures.

Monitoring wells, which will be generally farther from the building than cores to test for mercury accumulations, will be

sampling gases near the ground surface will be difficult because of varying levels of near-surface contamination.

Mercury accumulations beneath the water table will be hidden because of limited gas migration. Several techniques that take advantage of the properties of mercury have been proposed to test holes for mercury during and after drilling. In general, it is not expected to encounter elemental mercury in cores because air, water, or drilling mud injected at pressure to remove cuttings will tend to displace the mercury in joints or fractures.

1. During drilling, mercury 'sniffers' may be used to detect mercury in cuttings and air (if air rotary rig) from down hole. This technique could provide a log of mercury intersections. Cuttings will be visually inspected for mercury.
2. Cuttings can be analyzed for mercury content to evaluate subsurface contamination.
3. Electric logs may be run in holes to take advantage of the conductive properties of mercury. Interference may result from foundations and underground utilities.
4. Bailing holes to measure mercury accumulation (if any) through time will detect mercury and mercury movement.

Investigations for accumulations of mercury are expected to demonstrate the presence or absence of mercury in the subsurface at various locations (drill sites). The quantification of the amount of mercury in the subsurface is not expected to be possible because of the mobile nature of elemental mercury and the influence of drilling operations, as well as the discontinuous nature of subsurface features.

Based on analysis of piezometric surfaces in the Conasauga Group west of the Y-12 Plant, it is expected that groundwater monitoring wells can be placed with sufficient confidence to test for contamination of groundwater in and around the plant. Due to the low solubility of elemental mercury in natural groundwater, wells will have to be carefully constructed and sampled to detect any mercury in solution.*

6.7 CONCLUSIONS

A small percentage [redacted] of the total inventory of mercury brought into Y-12 was discharged or leaked into the environment during operation of the lithium cascades. Mercury emissions to air during these operations are estimated to have been about 50,000 lb. Aquatic discharges of mercury to East Fork Poplar Creek are estimated to have

*"Draft Project Description: Y-12 Plant Subsurface Mercury Investigation," T. R. Butz.

been about 240,000 lb. Losses to land were about 450,000 lb. Mercury-contaminated solid wastes requiring disposal were not generated during cascade operations. Mercury-contaminated equipment removed after operations ceased was either sold for salvage or landfilled. The following subsections summarize the nature and results of past studies of the environmental impacts of releases and losses of mercury to air, water, and land.

6.7.1 Air

Mercury emissions into air at Y-12 are estimated to have been about 50,000 lb, but studies to document the environmental fate and impacts of this mercury have not been conducted. Emphasis was placed on worker health (see Sect. 5), and thus no systematic studies were conducted outside buildings or outside the plant boundaries. Studies around chlor-alkali facilities and coal-fired steam plants have suggested that vaporous emissions of mercury are widely dispersed into the downwind air mass with little net local deposition (~5% of emissions within 3 km) on soils and vegetation. Nonetheless, soils and vegetation near (within a few miles) operating chlor-alkali plants have shown elevated mercury levels.

6.7.2 Water

Mercury discharges into East Fork Poplar Creek since 1955 have been systematically measured. Sampling and analytical methodology have changed over this period as technology and the perception of inorganic mercury as a hazard have changed. Concentrations of mercury in plant discharge water between 1954 and 1959 were high (quarterly averages ranged from 0.2 to 3.7 mg/L or ppm) in comparison to natural waters and to other industrial discharges. Following a process change in 1959, mercury concentrations decreased sharply to levels (<0.5 mg/L) similar to those of discharge waters from chlor-alkali plants and river water in the vicinity of mercury mineral deposits.

In 1963, New Hope Pond was constructed as a means of moderating pH fluctuations (3 to 12) in plant discharge waters. The pond has served its original intended purpose well (subsequent pH values ranged between 6 and 9) and has provided the additional benefit of trapping significant quantities of sediment-borne mercury. Approximately 19,000 yd³ of sediment containing 6,464 lb of mercury were removed (by hydraulic dredging) from the pond in 1973 and placed in a specially constructed landfill on Chestnut Ridge. In addition, a small quantity (~162 lb) has been removed since 1973, making a total of 6,626 lb that has been placed in Chestnut Ridge.

Following the revelation in the late 1960s that inorganic mercury discharged in streams and lakes could be converted by native bacteria (and other microorganisms) to highly toxic organic mercury (methylmercury), over 50 receiving waters in the U.S. were identified as receiving inorganic mercury discharges. Fish inhabiting waters downstream of many of these industrial discharges were found to contain unacceptable levels (>0.5 µg/g as of 1970) of mercury in the edible

portion, resulting in the placement of restriction on sport and commercial fishing in certain receiving waters in 18 states as of September 1970. In 1970, the Y-12 Environmental Coordinator initiated a study of the mercury content of fish, water, and sediment collected in East Fork Poplar Creek and Bear Creek. Most of the fish (9 out of 12) collected below the discharge (10 bluegill and 2 carp) contained more than 0.5 $\mu\text{g/g}$ mercury in the edible portion, with the highest value being 1.3 $\mu\text{g/g}$. Nine fish were collected in Bear Creek, and one exceeded the 0.5 $\mu\text{g/g}$ level.

Water and sediment data for East Fork Poplar Creek indicated mercury concentrations that were elevated above natural background but that were similar to concentrations observed downstream of chlor-alkali plants and areas of natural mercury mineralization. Water and sediment data for Bear Creek indicated background levels of mercury.

Since 1970, a number of studies have involved sampling water, fish, and/or sediments from creeks around the Oak Ridge facilities. Analysis of sediments from East Fork Poplar Creek in 1974 by John Reece confirmed the earlier reported ranges of mercury levels and noted that floodplain soils showed a similar level of contamination. Beginning in 1971, annual reports on environmental surveillance around the Oak Ridge facilities gave mercury data for water and sediment for selected sites on the Clinch River, Poplar Creek, and East Fork Poplar Creek. Mercury analyses of numerous environmental samples (including 649 fish from the Clinch River, Melton Hill Lake, and Poplar Creek) were performed during 1976 and 1977, with the results being released to the media and regulatory agencies as a Union Carbide "Environmental Monitoring Report." Concerning mercury, the report stated that New Hope Pond effluent ranged from 0.5 to 3 $\mu\text{g/L}$ in water and sediment samples from around ORGDP near the confluence of Poplar Creek and the Clinch River contained 1.4 to 154 $\mu\text{g/g}$ of mercury. Sixty-two edible fish ($\sim 10\%$ of the total) contained mercury exceeding the contemporaneous proposed FDA action level of 0.5 $\mu\text{g/g}$. Fish taken near ORGDP generally exhibited the highest levels of mercury (e.g., largemouth bass and bluegill averaged 0.72 $\mu\text{g/g}$ and 0.42 $\mu\text{g/g}$, respectively). No fish were collected or analyzed for mercury in East Fork Poplar Creek.

The elevated levels of mercury in fish taken around ORGDP prompted a more detailed study that was carried out by J. W. Elwood of ORNL. Elwood's study essentially confirmed results of earlier studies but was the first study to consider the effect of fish size on mercury concentration. Additional information provided by the Elwood study showed that 95% of the total mercury in fish collected around ORGDP was in the methyl form. This finding was not unexpected because similar findings had been reported for other areas in North America and elsewhere. Elwood identified East Fork Poplar Creek and Bear Creek as potential sources of the elevated mercury concentrations in Poplar Creek and the Clinch River and recommended follow-up studies to define the sources and to characterize the downstream receiving system, including the floodplain of East Fork Poplar Creek. Although some of the recommendations were acted upon, no sediment or fish data were collected for East Fork Poplar Creek or Bear Creek until 1982.

In December 1981, an ORNL employee (S. B. Gough) collected a series of moss, liverwort, and root samples at sites along Bear Creek and East Fork Poplar Creek. The samples were analyzed by the USGS (Denver) and were later reanalyzed by Y-12. The results confirmed what was known or suspected from previous surveys in 1970 and 1974 (i.e., that East Fork Poplar Creek is contaminated with mercury). Mercury values for moss from East Fork Poplar Creek were similar to moss values near the Almadén, Spain, mercury mining area.

Results of the Gough sampling prompted a more comprehensive survey in May 1982 of Bear Creek and East Fork Poplar Creek for mercury contamination. Sediment, fish, moss, and floodplain pasture grass were sampled. In addition, a sediment core was collected in New Hope Pond to determine recent (post-1973) trends in sediment mercury concentrations. Results suggested an apparent decrease since 1973, or earlier, in the mercury concentration of sediment entering New Hope Pond ($300+100 \text{ }\mu\text{g/g}$). Mercury concentration in sediments of East Fork Poplar Creek immediately below New Hope Pond was similar to the concentration in the surface sediment of New Hope Pond, which suggested a common and currently active source within Y-12 for mercury in the creek and the pond. Mercury concentration in the sediment decreased with distance downstream, indicating dilution of the contaminated sediment with uncontaminated sediment from tributary drainages entering East Fork Poplar Creek. Mercury concentrations in sediment at all sampling sites on East Fork Poplar Creek exceeded background by a factor of 60 or more. Total mercury concentration in muscle tissue of bluegill from East Fork Poplar Creek was positively correlated with body weight, as expected. Although there was a decrease in concentration with distance downstream, mercury concentration in 87% of the bluegill collected at the three upstream locations (0 to 7 miles below New Hope Pond) exceeded the FDA action level ($1.0 \text{ }\mu\text{g/g}$) for mercury in the edible portion of fish. Total mercury concentration in moss, as in sediments and bluegill, decreased with distance downstream in East Fork Poplar Creek. Total mercury concentrations averaged 3.5 and $0.2 \text{ }\mu\text{g/g}$ for dead and live foilage in pasture grass, respectively, on the floodplain of the East Fork Poplar Creek. Results for Bear Creek indicated that this drainage was considerably less contaminated with mercury than that of East Fork Poplar Creek. Recommendations were made (1) to limit the quantity of mercury released from the Y-12 Plant area into East Fork Poplar Creek, (2) to notify the responsible state agencies and fishermen concerning mercury concentrations found in fish in East Fork Poplar Creek, and (3) to measure mercury concentration in beef from cattle grazing on the floodplain of East Fork Poplar Creek. Within the following year, actions were taken on all of these recommendations.

During the period August through November 1982, limited samples of cow and horse hair and cow tissue (muscle, liver, kidney, brain) were obtained from animals grazing on the floodplain of East Fork Poplar Creek and from control animals for mercury analysis. Results of this limited sampling did not reveal elevated concentrations of mercury in animals grazing on the floodplain of East Fork Poplar Creek.

Beginning in October 1982, a comprehensive investigation of current sources and discharges of mercury in drainage waters of the Y-12 Plant was initiated. In addition to quantifying the typical daily discharge of mercury into East Fork Poplar Creek, the investigation entailed upstream-tracing of mercury sources and development of a detailed mass balance for mercury in drainage waters. Among other findings, the study has thus far revealed that most of the mercury in drainage waters is originating from old production buildings (9204-4, 9201-5, 9201-4, 81-10, and 9201-2). The combined losses from these buildings amounted to about 170 g/d (6 oz/d) based on a comprehensive survey in early December 1982. Input to New Hope Pond at the same time was about 146 g/d, suggesting some temporary accumulation in the industrial ditch upstream of New Hope Pond. Effluent from New Hope Pond during the same period was about 42 g/d, suggesting that the pond was capturing about 70% of the input mercury. Other inflow-outflow measurements on New Hope Pond have indicated mercury trapping efficiencies ($100 \times \text{input-output}/\text{input}$) of about 50%. Limited measurements during storm flow conditions have indicated both higher discharges of mercury (up to several thousand grams per day instantaneous loading) and essentially 0% trapping efficiency of New Hope Pond. Typical storm flow discharges appear to be more in the range of several hundred grams per day instantaneous loadings. However, sufficient storm flow data are not currently available to assess the influence of storms on total annual discharges of mercury from the Y-12 Plant.

As a result of the mercury source investigation, mercury cleanup activities in the old production buildings were initiated again in March 1983. These activities have included sludge removal from sumps in Buildings 9201-4 and 9201-5 as well as recovery of all visible mercury in accessible pipes and drains.

In addition to these recent investigations of sources and recent environmental fate of Y-12 mercury discharges, one recent investigation (undertaken by the Y-12 Mercury Task Force) has addressed the question of the environmental fate of the large discharges (210,038 lb) of mercury between 1955 and 1963. In June 1983, two sediment cores were collected in Watts Bar Lake at locations that are 62 and 50 rivermiles below the Y-12 Plant. One of these cores penetrated through the entire thickness of sediments deposited since Watts Bar Dam was first closed in 1943. This core contained a sharp peak in mercury concentration (maximum value = 7 $\mu\text{g/g}$) in sediment layers deposited between 1955 and 1959. Sediment layers deposited subsequently (1960-1983) showed decreasing mercury concentrations, with current surface levels of 0.8 $\mu\text{g/g}$ (i.e., about three times natural background). The other core showed increasing mercury concentration with increasing depth in the mud suggesting that the core was insufficiently long to intercept layers deposited in the latter half of the 1950s. These results lend considerable credence to the contention that most of the discharges of mercury to East Fork Poplar Creek occurred between 1955 and 1959, prior to a process change that greatly reduced aquatic discharges of mercury. These core data also suggested that most of the mercury lost to East

Fork Poplar Creek may be buried under at least 10 in. of mud in Watts Bar Lake and thus currently not readily available to the biosphere.

6.7.3 Land

The environmental fate and effects of losses of about 440,000 lb of mercury to the terrestrial environment have not yet been extensively investigated. Terrestrial losses (or discharges) have been of three types:

1. Spills that occurred outside process buildings or in areas without containment structures (428,000 lb).
2. Landfill disposal of contaminated equipment (no estimate).
3. Landfill disposal of sludges dredged or resident in New Hope Pond (13,000 lb).

During operation of the lithium cascades, no mercury-contaminated sludges were generated that were not subjected to mercury recovery by furnacing. Thus Y-12 landfills do not contain mercury sludges from the period of cascade operation. Some equipment subsequently removed from process buildings was disposed of in Y-12 landfills, but no systematic studies of the leaching and subsurface transport of mercury away from these disposal areas have been carried out. Monitoring data for groundwater wells located near the S-3 ponds and landfills at the west end of the Y-12 Plant have shown some above-background mercury levels.

Following various large-scale spills of mercury around or in process buildings, considerable effort was made to locate and recover the spilled mercury. Nonetheless, a significant quantity (424,853 lb) was never recovered and was assumed to have percolated into underlying structural fill and bedrock. Prior to 1983, no systematic drilling program had been undertaken to discover the unaccounted for mercury lost by spillage or to evaluate the influence of this mercury on local groundwater quality. A comprehensive subsurface investigation of mercury accumulation was planned in June 1983 with exploratory drilling and monitoring well emplacement to commence in July 1983.

Sludge dredged from New Hope Pond has been disposed of in a small landfill constructed on Chestnut Ridge in 1973 for this purpose alone. Two lines of evidence suggest that mercury in these sludges has not migrated into local groundwater. First, analyses of springwater and groundwater collected down gradient (hydrologically) have not shown elevated mercury concentrations. Second, performance of the sludge in the RCRA leach test (EPA leaching protocol for classification of hazardous wastes) has indicated that the mercury is not significantly leachable, even under the acidic (pH 5) conditions of the test.

6.7.4 Fish

The mercury concentrations in fish depend on species and size as well as on the mercury concentration in their environment. The added

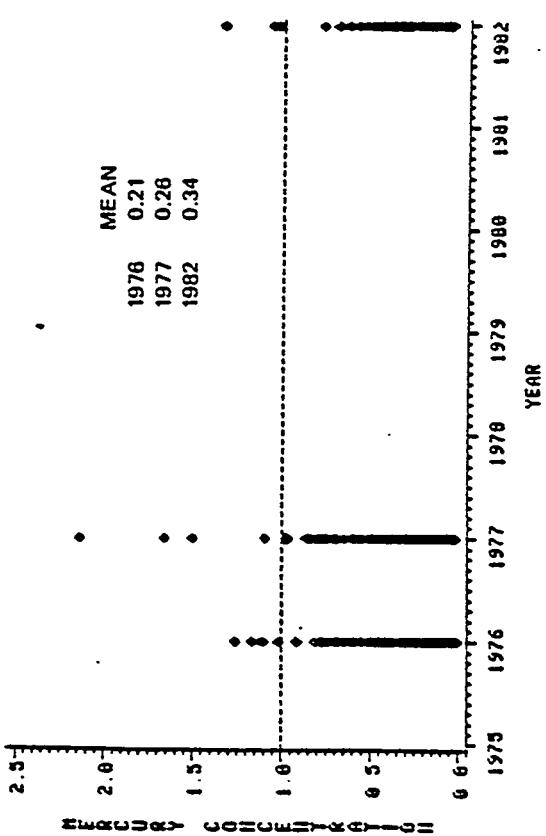
factor of their mobility makes interpretation of the data obtained through the years difficult. The data that perhaps are most useful for analysis are those fairly sizable populations collected in 1976 (Elwood), 1977, and 1982, (Mitchell). There are enough data points in these collections to say something about mercury concentrations in locations and species as a function of time. There is a graphical summary of the data plotted as a function of time presented on the pages following (Fig. 6.15). The data suggest these conclusions:

1. There is no statistically significant reason to believe mercury in fish concentrations are either increasing or decreasing over the past seven years at the junction of East Fork Poplar Creek and Poplar Creek (Location PC-2) or near the junction of Poplar Creek and the Clinch River (Location PC-1). Looking just at the latter location and at all fish species, there is an apparent improvement or decrease in the 1982 sampling.
2. Although there are a few fish in each year's sampling which exceed the FDA 1.0 ppm level, it is recognized that this level is to be applied to averages and not to individual fish. The averages are well below 1.0 ppm:

	<u>Only at</u>	
	<u>PC-1</u>	<u>PC-2</u>
1976, All species, all locations: 0.21 ppm	0.41	0.38
1977, All species, all locations: 0.26 ppm	0.25	0.32
1982, All species, all locations: 0.34 ppm	0.14	0.44

The data are also shown for each species and for each location for easy comparison of the data set.

FISH FROM POPLAR CREEK AND CLINCH RIVER
 BASS, BLUEGILL, CATFISH, AND CRAPPIE
 CONCENTRATION MEASURED IN MICROGRAMS PER GRAM



MERCURY CONCENTRATION IN FISH
 BASS, BLUEGILL, CATFISH, AND CRAPPIE
 CONCENTRATION MEASURED IN MICROGRAMS PER GRAM
 LOC-PC-1

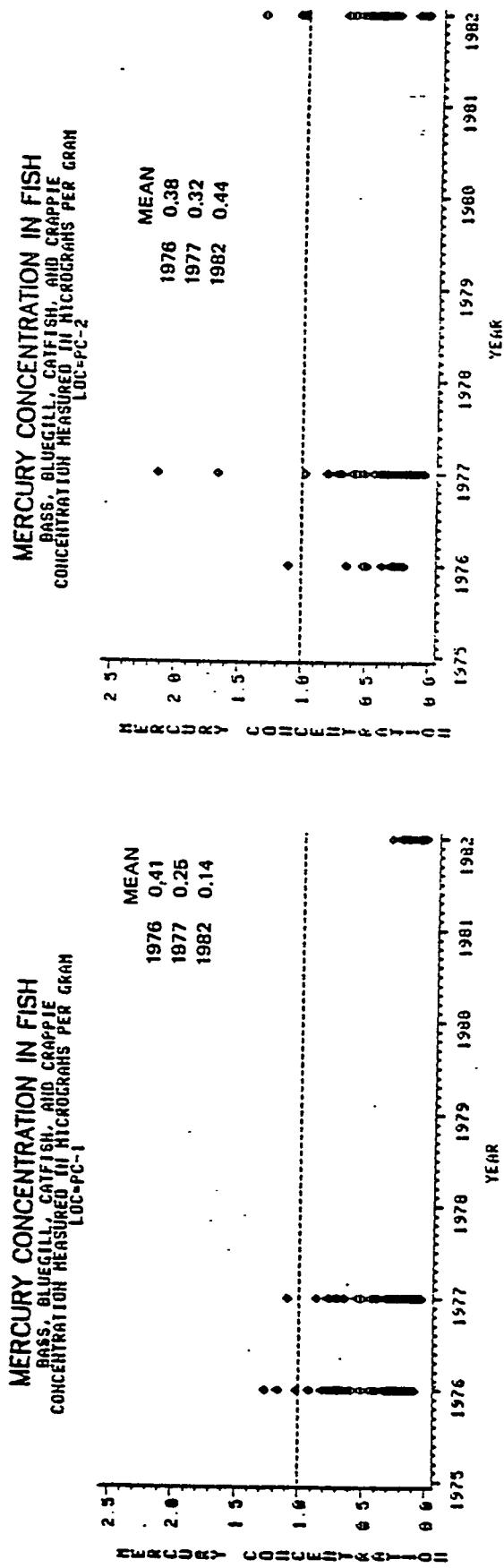
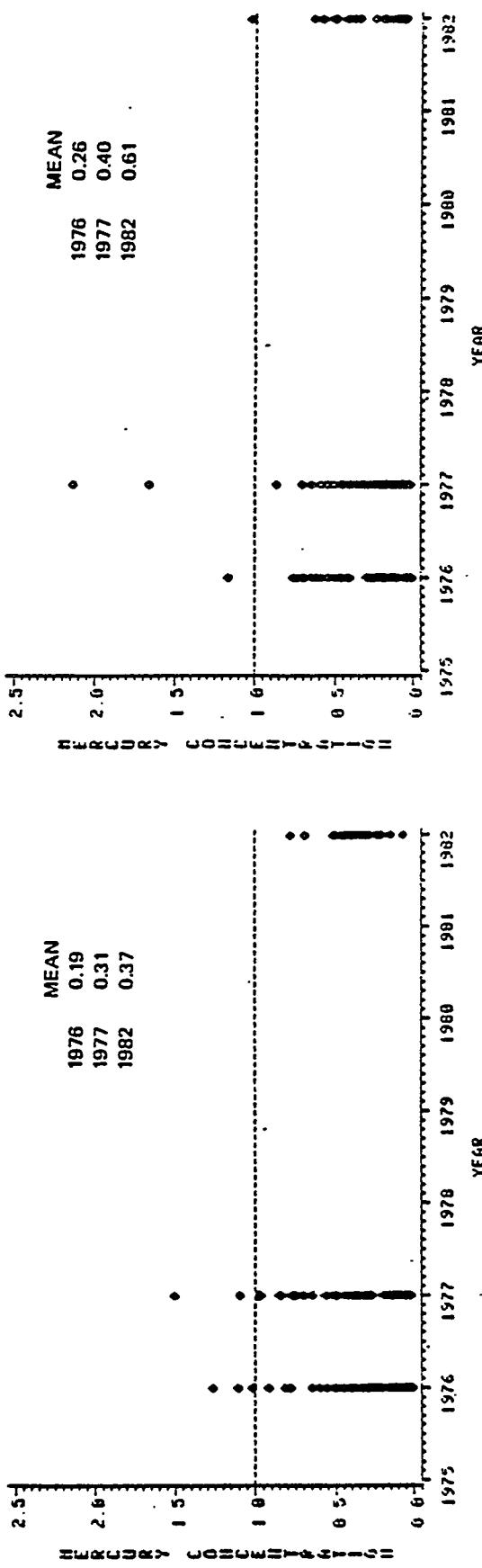
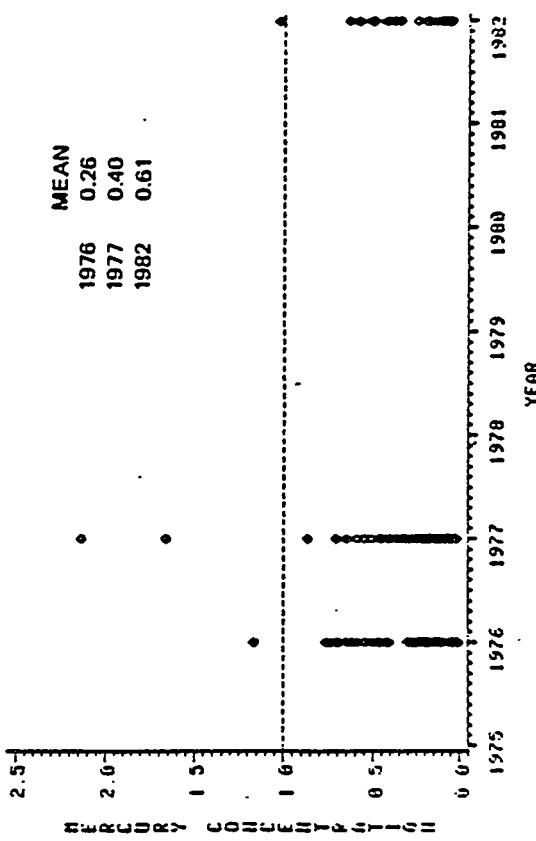


Fig. 6.16. Graphical summary of mercury concentration in fish (data plotted as a function of time).

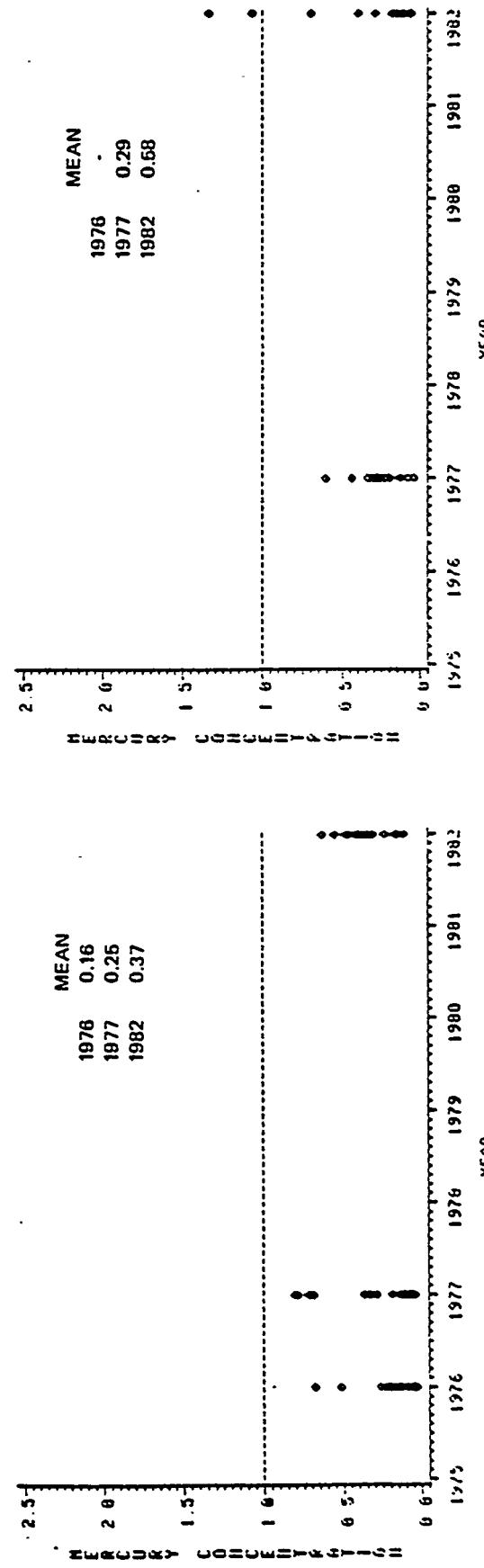
FISH FROM POPLAR CREEK AND CLINCH RIVER
CONCENTRATION MEASURED IN MICROGRAMS PER GRAM
SPECIES=CRAPPIE



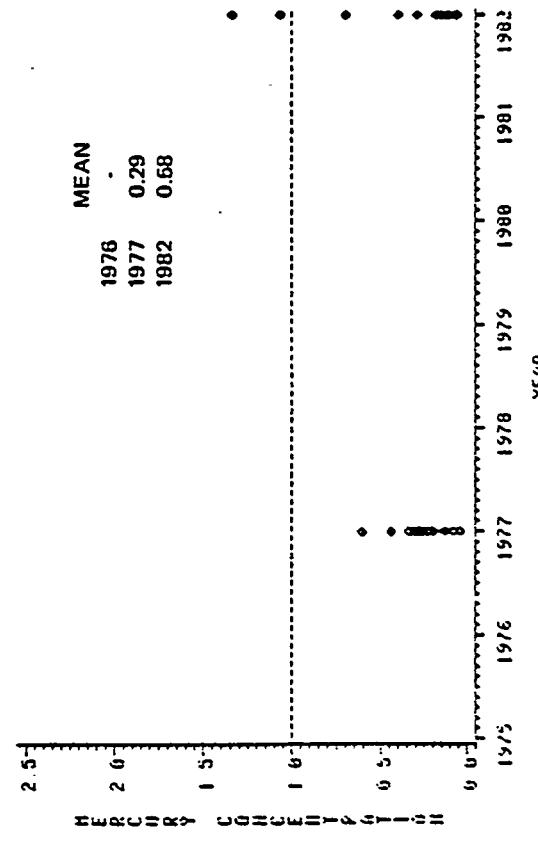
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CONCENTRATION MEASURED IN MICROGRAMS PER GRAM
SPECIES=BLUEGILL



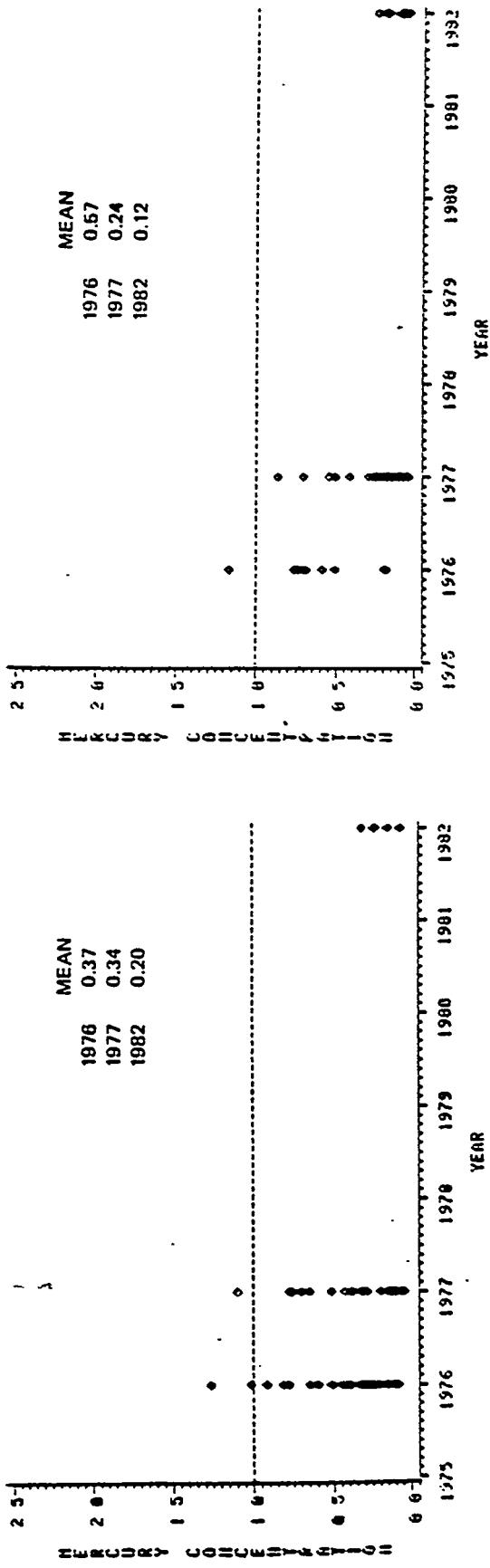
FISH FROM POPLAR CREEK AND CLINCH RIVER
CONCENTRATION MEASURED IN MICROGRAMS PER GRAM
SPECIES=CRAPPIE



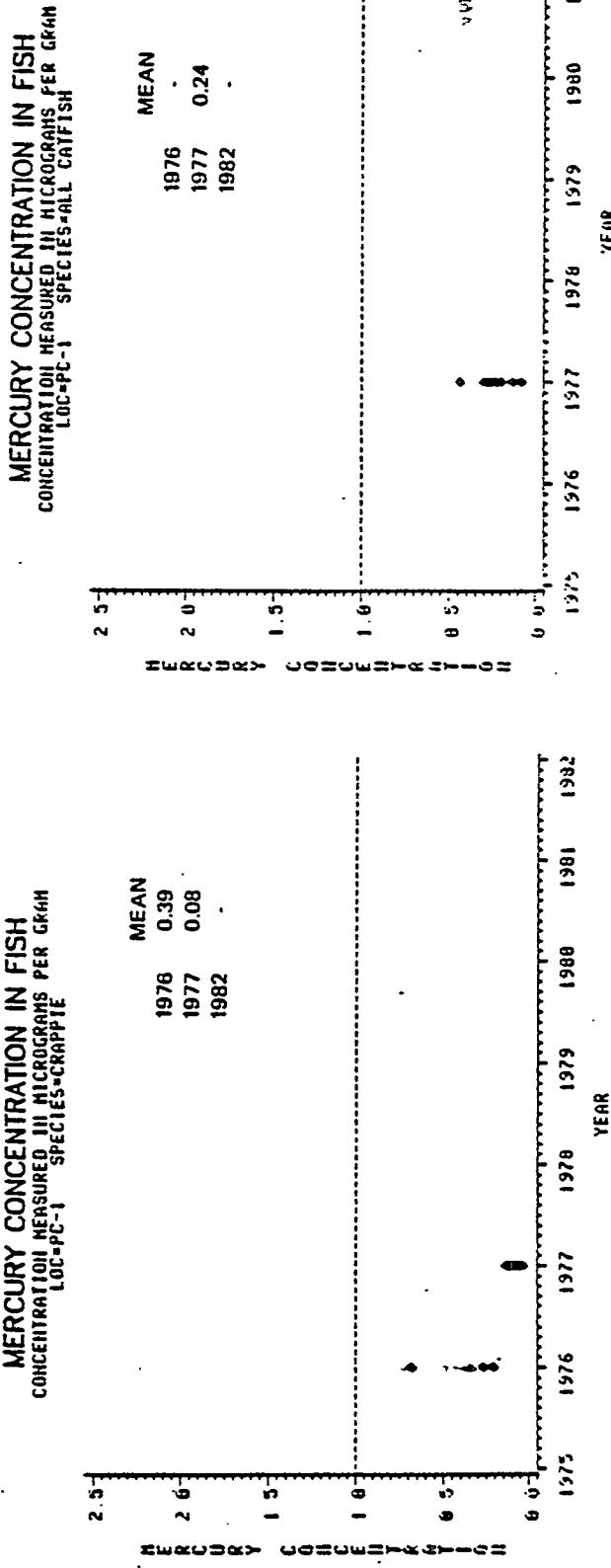
FISH FROM POPLAR CREEK AND CLINCH RIVER
CONCENTRATION MEASURED IN MICROGRAMS PER GRAM
SPECIES=ALL FISH



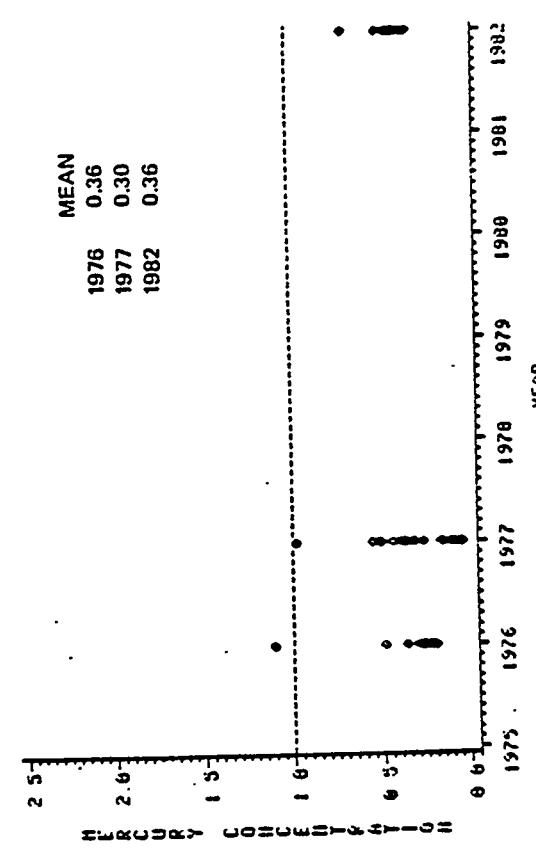
MERCURY CONCENTRATION IN FISH
CONCENTRATION MEASURED IN MICROGRAMS PER GRAM
LOC-PC-1 SPECIES-BLUEGILL



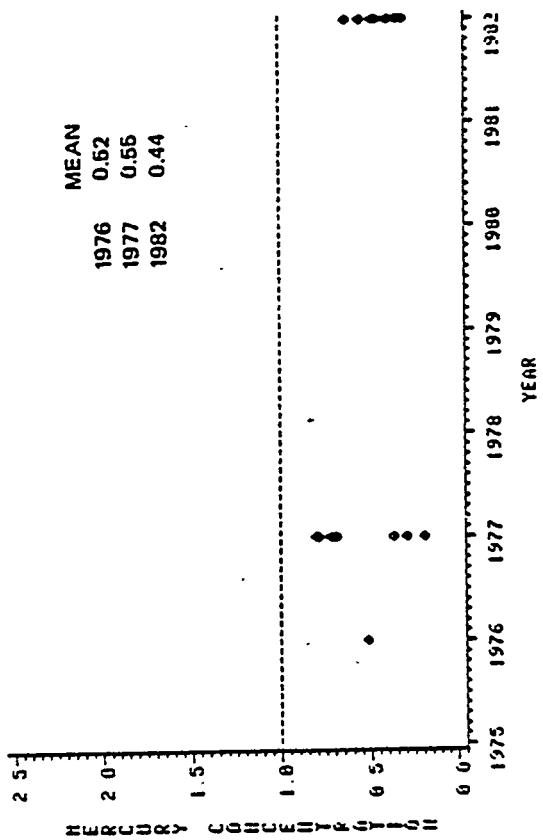
MERCURY CONCENTRATION IN FISH
CONCENTRATION MEASURED IN MICROGRAMS PER GRAM
LOC-PC-1 SPECIES-ALL BASS



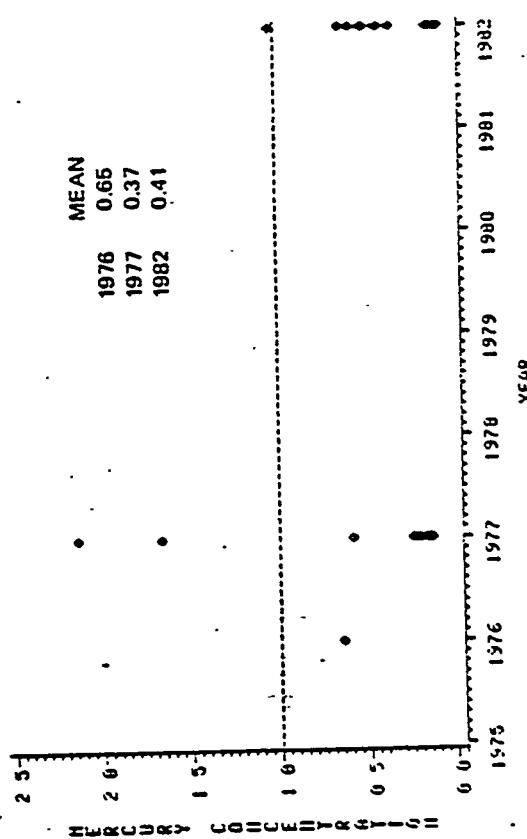
MERCURY CONCENTRATION IN FISH
CONCENTRATION MEASURED IN MICROGRAMS PER GRAM
LOC=PC-2 SPECIES=CRAPPIE



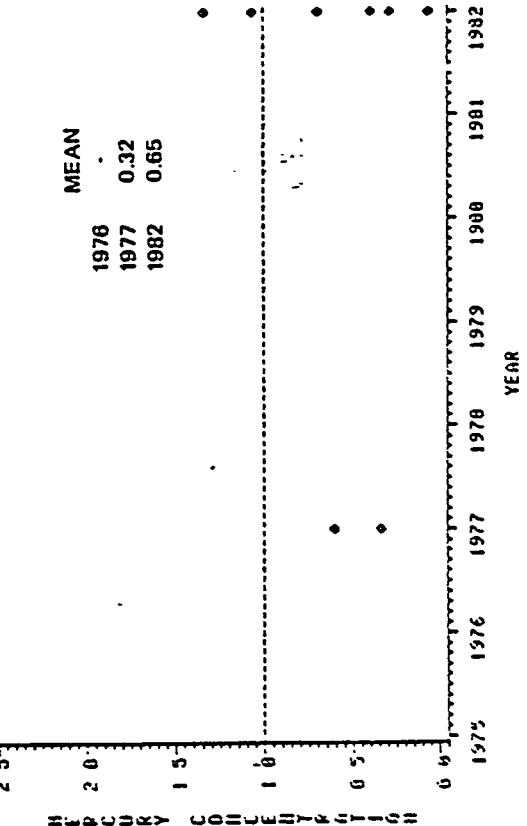
MERCURY CONCENTRATION IN FISH
CONCENTRATION MEASURED IN MICROGRAMS PER GRAM
LOC=PC-2 SPECIES=CRAPPIE



MERCURY CONCENTRATION IN FISH
CONCENTRATION MEASURED IN MICROGRAMS PER GRAM
LOC=PC-2 SPECIES=ALL BASS



MERCURY CONCENTRATION IN FISH
CONCENTRATION MEASURED IN MICROGRAMS PER GRAM
LOC=PC-2 SPECIES=ALL CATFISH



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ACRONYM GLOSSARY

ACGIH	American Congress of Governmental Industrial Hygienists
ADP	Alloy Development Program
AEC	Atomic Energy Commission
AIHA	American Industrial Hygiene Association
ANSI	American National Standards Institute
ASA	American Standards Association
CARL	Comparative Animal Research Laboratory
CNS	Central Nervous System
DOE	Department of Energy
EP	Extraction Procedure
EPA	Environmental Protection Agency
ERDA	Energy Research and Development Administration
FDA	Federal Drug Administration
GSA	General Services Administration
MAC	Maximum Allowable Concentration
MPL	Maximum Permissible Level
NESHAP	National Emission Standard Hazardous Air Pollutants
NIOSH	National Institute for Occupational Safety and Health
OMM	Office of Materials Mobilization
ORAU	Oak Ridge Associated Universities
ORNL	Oak Ridge National Laboratory
ORGDP	Oak Ridge Gaseous Diffusion Plant
ORO	Oak Ridge Operations
OSHA	Occupational Safety and Health Act
PAV	Plant Action Value
QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
SMR	Standardized Mortality Ratio
STEL	Short-Term Exposure Limit
TLV	Threshold Limit Value
TVA	Tennessee Valley Authority

ACRONYM GLOSSARY (Cont.)

TWA Time-Weighted Average

UCC-ND Union Carbide Corporation, Nuclear Division

USGS United States Geology Survey

M-Files to Look At

Specific No's (bills)

or 815	M-601	837	103
136 "	M-445 "	839 °	EC 113
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393 "	M-803	275 276 278 281 282 285	181
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438	477 " <small>HTT flaking</small>	361 75-83	
	458 "	589 1/53	
772	822	585	M-780 " work papers"
439	220 "	587	M-786 (DwP) interviews
440	801	588 5/63	M-489 TForce memo (HTA I)
223	382 " <small>HTT - Elwood</small>	842 HTT	✓ M-490's HTPhysics reports
55	843 " <small>HTT</small>	732	
506	798	817	81-10: 65, 68, 80, 810, 836
54	796 "	748	
750	804	731	
832	797 " <small>AIR - Solvent heat comm.</small>	745	
827	482 " <small>HTT HTT HTT</small>	733	
834	746		
	247	References	
835	509	p. 101 (12) M-68 81-10	
838	630	p. 155 (2) Litter " ← HTM	
806	603	p. 213 (39) " ?	
		p. 244 (41) " ?	
		" (44ete) Committee mtgs + decon memos ✓	
		p. 289 (19) Elwood ✓ requested	

Notes from Case 1971, LaGrone 1983.

Hg Task Force ^{Report} References Notes

Documents:

oldest document is 1-49 (Health Physics Progress Report)

- ✓ HP Progress Reports (1-49 to 12-52)
- ✓ Y-12 Plant Quarterly Reports (10-52 to 12-81)
- ✓ Technical Division Monthly Reports (1-55 to 11-58)
- ✓ Alloy Division Weekly Progress Reports (1-55 to 3-59)
- ✓ Alloy Division Monthly Progress Reports (10-55 to 12-61)
- Y-12 Plant Monthly Progress Reports (12-58)
- ✓ Y-12 Quarterly Technical Progress Reports (7-59 to 6-68, or 75?)
- Y-12 Development Division- Technical Progress Report (5-71)

so many documents about Hg flasks/ flasking operations!

oldest environmental monitoring report is for CY 1971, followed by 1972, 73, 75, 76, 77, 78, 80, 81, 82

Abbreviations:

ADP= Alloy Development Plant

solvent= Hg

alloy= uranium?

Aspen Shop/ Aspen salvage= production of lithium deuteride

Building Air:

hi Hg in air in 1954 due to summer heat and hi operating power level

construction project- air and water pollution control for Li facilities in June 1967

- ✓ Radiation Safety Dept., Radiation Safety 2090-IH-4 (10-55 to 8-63)
- Raw Data for Colex Reports (1-53 to 5-63)

Studies:

Univ. of Rochester to study Hg (1956, 1983)

worker health and safety data from 50s, 60s declassified in 6-72

Zeb Bell (NIOSH) Hg study (1973-74)

ORAU mortality study (1983)

Operations:

fans in late 1955

beta 4 dismantled/stripped in summer 1956; Elex production 1953-56

furnace (7-56) (10 g,000)

losses of 82,000 lbs Hg from alpha 2 (1957)- Elex 1950-51

flue gases from solvent roaster (1958)

recovery of Hg in bldg. 9720-26 (started in 1963)- Colex ended in 1963

9202- Orex 1951-53

53-54
50,000 lbs lost

9133-1 Orex 1951-52

no losses

51
9133-2
Elex,
Colex 1951-55
no losses

X-10: 4501 1954
3592

55-59; 62-63

alpha 5 stripped in 1965-66 - Colex 1955-62; 63

decomming a Hg storage facility in 8-73

worried about Hg storage in alpha 4 (8-75)

alpha 4 decommned in 8-76¹¹ - Colex 1955-62

recovery of Hg in bldg. 81-10 (1971 logbook)

New Hope Pond dredged in 9,10-72

Lake Reality

Accidents:

3-28-66 in alpha 5

previous (prior to 1-56, 8-75) spill(s) of Hg in alpha 5

prior to 2-11-71 incident in alpha 2

12-31-82 spill (George Evans)

11-56
1-56
Summer 56
7-56

Environmental:

daily water flows in EFPC (1955-56)

? an 8-26-68 letter from Case to Keller said that early estimates of Hg losses were understated

first mention of creek/river contamination is 4-77/ Jerry Elwood's report came before Case's

background concs of Hg in fish from GSM National Park (1974)

Hg in moss (1975)

fossil fueled plants

chloralkali plants

Specific Documents to Look At

Solvent Hazard Committee Meeting Reports 1 through 9 (11-30-55 through 2-6-56), Decon Reports 1-11
Local News Accounts File (5-83)

[more?]

✓= cross checked with HAI Report

APPENDIX: BIBLIOGRAPHY

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over 1000 doc's (PhT rpt.)
1-853 M files

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Department of Energy - Oak Ridge

1-12. H. D. Hickman (12)

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13. J. W. Arendt
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15. C. C. Hopkins
16. L. L. McCauley
17. F. S. Patton/J. A. Parsons
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ORNL

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20. N. K. Bernander
21. W. H. Dodson
22. G. G. Fee
23. R. F. Hibbs/J. K. Denton
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27. R. G. Jordan
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Y/EX-24

(Y-12 1983a)

APPENDIX
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As part of the 1983 Mercury Task Force effort to review the use of mercury at Y-12, a collection has been made of the files, reports, and information still available at Y-12. This collection, now stored in 19 file drawers, has been indexed and will be available as the Mercury Task Force File at the Y-12 Plant (contact Plant Records). Several types of indexes are available: subjects, authors, dates, etc. Annotations in the form of simple comments on the subjects have been included in the computer data base. This data base includes information developed up to June 1983 and therefore does not include the information presented in the Congressional Hearings held on July 11, 1983, or the follow-up studies. The bibliography presented herewith is sorted into the following nine categories:

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Accounting and Budget Data	384
Mercury Shipment Data, Flask Data, and Equipment	
Lists	392
Health Records	401
Production Operating Records	406
Open Literature	408

The mercury data base is stored on the classified Time Sharing Computer System (TSCS) in Building 9103. The TSCS is under the direction of R. W. Henderson, Computer Sciences Y-12 site representative.

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(REQUIREMENTS OF PRIME VIRGIN MERCURY FOR ELEX PLANT.)
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(GIVES COST ESTIMATE FOR BOTTLING MERCURY AND REMOVAL OF EQUIPMENT.)

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(52,000 FLASKS OF MERCURY TRANSFERRED TO GSA.)

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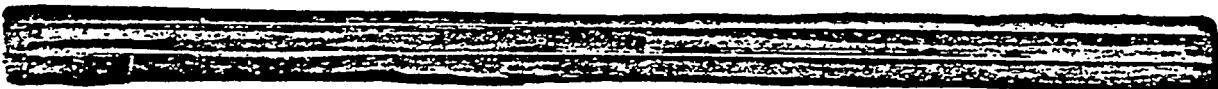
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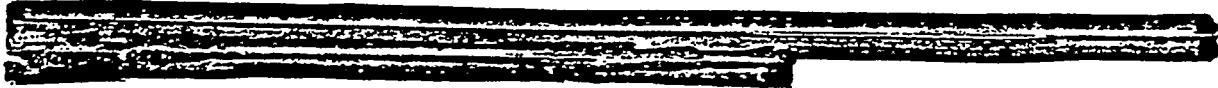
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KELLER, C. A., "DISPOSAL OF MERCURY. LETTER TO R.F. HIBBS (UCC) FROM C.A. KELLER (AEC).," (U), 1965, JANUARY 14, DRAWER 17, M-384
(PROCEDURE TO ACCOUNT FOR COST OF GOODS SOLD BY GSA)

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KELLER, C. A., "EXCESS MERCURY DISPOSAL, LETTER TO R.F. HIBBS, (UCC) FROM C.A. KELLER (AEC)," (U), 1964, JULY 1, DRAWER 17, M-384
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(DESCRIPTION OF LOSS AND SUBSEQUENT SALVAGE OPERATIONS)

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KELLER, C. A., "DISPOSAL OF MERCURY, LETTER TO R.F. HIBBS (UCC) FROM C.A. KELLER (AEC)," (U), 1965, JANUARY 14, DRAWER 17, M-384
(PROCEDURE TO ACCOUNT FOR COST OF GOODS SOLD BY GSA)

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KELLER, C. A.. "FLASKING OF EXCESS MERCURY, LETTER FROM C. A. KELLER (AEC) TO R. F. HIBBS (UCC)," (U), 1965, JANUARY 19, DRAWER 17, M-389 (PLANS TO PROCESS AND STORE USABLE FLASKS)

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KELLER, C. A.. "STRIPPING OF ALPHA-5 EQUIPMENT, LETTER FROM C. A. KELLER (AEC) TO R. F. HIBBS (UCC)," (U), 1965, MARCH 17, DRAWER 17, M-479 (AUTHORIZATION BASED ON ASSUMPTION USEFUL APPLICATIONS OF EQUIPMENT WILL BE SOUGHT.)

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JOHNSON, V. E.. "COST RATE ON WAREHOUSE STORAGE OF STOCKPILE MATERIALS, LETTER FROM V. E. JOHNSON (GSA) TO DAN POLLEY (AEC)," (U), 1965, APRIL 7, DRAWER 17, M-393

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HIBBS, R. F.. "MERCURY HANDLING AT THE Y-12 PLANT, LETTER FROM R. F. HIBBS (UCC) TO C. A. KELLER (AEC)," (C), 1965, MAY 7, DRAWER 17, M-760 (METHODS OF PROTECTION AGAINST DIVERSION)

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KELLER, C. A.. "SURPLUS MERCURY, LETTER FROM C. A. KELLER (AEC) TO R. F. HIBBS (UCC)," (U), 1965, MAY 25, DRAWER 17, M-389 (GSA AGREED TO ACCEPT 35-36T FLASKS FOR DISPOSAL)

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KELLER, C. A.. "ALPHA-4 OPERATION STUDY, LETTER FROM C. A. KELLER (AEC) TO R. F. HIBBS (UCC)," (C), 1965, JUNE 4, DRAWER 17, M-480 (REQUEST FOR OPERATIONAL DATA AT VARIOUS FRACTIONS OF CAPACITY TO PROVIDE INFORMATION ON MERCURY INVENTORY AND RESERVE REQUIREMENTS.)

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KELLER, C. A.. "MERCURY HANDLING AT THE Y-12 PLANT, LTR FROM C. A. KELLER (AEC) TO R. F. HIBBS (UCC)," (U), 1965, JUNE 16, DRAWER 17, M-389 (AEC CONCURS IN ADOPTION OF MERCURY-HANDLING PROCEDURES.)

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KELLER, C. A., "FLASKING OF EXCESS MERCURY, LETTER FROM C. A. KELLER (AEC) TO R. F. HIBBS (UCC)," (U), 1965, JANUARY 19, DRAWER 17, M-389 (PLANS TO PROCESS AND STORE USABLE FLASKS)

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KELLER, C. A., "STRIPPING OF ALPHA-5 EQUIPMENT, LETTER FROM C. A. KELLER (AEC) TO R. F. HIBBS (UCC)," (U), 1965, MARCH 17, DRAWER 17, M-479 (AUTHORIZATION BASED ON ASSUMPTION USEFUL APPLICATIONS OF EQUIPMENT WILL BE SOUGHT.)

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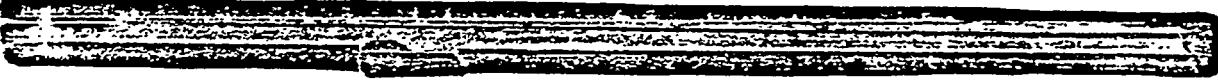
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HIBBS, R. F., "MERCURY HANDLING AT THE Y-12 PLANT, LETTER FROM R. F. HIBBS (UCC) TO C. A. KELLER (AEC)," (C), 1965, MAY 7, DRAWER 17, M-760 (METHODS OF PROTECTION AGAINST DIVERSION)

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KELLER, C. A., "ALPHA-4 OPERATION STUDY, LETTER FROM C. A. KELLER (AEC) TO R. F. HIBBS (UCC)," (C), 1965, JUNE 4, DRAWER 17, M-480 (REQUEST FOR OPERATIONAL DATA AT VARIOUS FRACTIONS OF CAPACITY TO PROVIDE INFORMATION ON MERCURY INVENTORY AND RESERVE REQUIREMENTS.)

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KELLER, C. A., "MERCURY HANDLING AT THE Y-12 PLANT, LTR FROM C. A. KELLER (AEC) TO R. F. HIBBS (UCC)," (U), 1965, JUNE 16, DRAWER 17, M-389 (AEC CONCURS IN ADOPTION OF MERCURY-HANDLING PROCEDURES.)

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 (OPERATIONAL DATA AT VARIOUS FRACTIONS OF CAPACITY WITH MERCURY INVENTORY REQUIRED FOR EACH.)

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HIBBS, R. F., "ALPHA-5 SCRAP DISPOSAL, LETTER TO C. A. KELLER (AEC) FROM R. F. HIBBS (UCC)," (U), 1965, JUNE 16, DRAWER 17, M-392
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 (SECURITY ASPECTS OF EQUIPMENT DISPOSAL.)

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 (AUTHORIZATION TO DISPOSE OF ALPHA-5 EQUIPMENT.)

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SAPIRIE, S. R., "INSPECTION BY USPHS OF UCC FACILITIES IN OAK RIDGE, REVIEW OF WASTE-WATER TREATMENT AND RADIOACTIVITY IN EFFLUENTS, LETTER FROM S. R. SAPIRIE (AEC) TO C. E. LARSON (UCC)," (U), 1965, SEPTEMBER 1,
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SAPIRIE, S. R.. "RECLASSIFICATION OF PLANT AND EQUIPMENT AS EXCESS. LETTER FROM S. R. SAPIRIE (AEC) TO C. E. LARSON (UCC)." (U). 1966, MARCH 4, DRAWER 17, M-479
(ALPHA 5 FACILITY RECLASSIFIED.)

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SAPIRIE, S. R.. "COMMITTEE TO INVESTIGATE APPARENT LOSS OF MERCURY AT THE Y-12 PLANT - MARCH 28, 1966. LETTER FROM S. R. SAPIRIE (AEC) TO COMMITTEE MEMBERS." (U). 1966, MARCH 30, DRAWER 17, M-478
(GROUP TO PRESENT RECOMMENDATIONS TO REDUCE PROBABILITY OF ACCIDENTS.)

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KELLER, C. A.. "ALPHA-4 PLANT OPERATIONS. LETTER FROM C. A. KELLER (AEC) TO R. F. HIBBS (UCC)," ORO-129341, (S), 1966, APRIL 11, DRAWER 17, M-480
(PLANS FOR ALPHA-4 PLANT OPERATIONS AFFECT AEC'S DECISION TO RELEASE FLASKS OF MERCURY TO GSA.)

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(REPORT PREPARED AT AEC HEADQUARTERS ON ANSWERS TO QUESTIONS RAISED FROM REVIEW OF USPHS DATA. UCC OAK RIDGE SITES.)

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HIBBS, R. F.. "ALPHA-4 PLANT OPERATIONS. LETTER FROM R. F. HIBBS (UCC) TO C. A. KELLER (AEC)," Y-AA-426, (S), 1966, APRIL 25, DRAWER 17, M-480
(EFFECT OF REQUIREMENTS ON LITHIUM PRODUCTION. INCLUDES MERCURY REQUIREMENTS.)

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(CORRECTION TO REPORT ON AEC WASTE WATER DISPOSAL PRACTICES RE SEWAGE DISCHARGE.)

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HIBBS, R. F.. "REQUEST FOR MODIFICATION, FORM CR-638, WORK ORDER S-1921, STRIP COLEX EQUIPMENT, 9201-5. LETTER FROM R. F. HIBBS (UCC) TO C. A. KELLER (AEC)." (U). 1966, APRIL 26, DRAWER 17, M-479
(STRIPPING OPERATION TO CEASE DURING SUMMER.)

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(94)

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(RECOMMENDATIONS OF COMMITTEE. EFFECTS OF SPILL LOSS.)

(96)

SAPIRIE, S. R., "ACCIDENTAL LOSS OF MERCURY AT Y-12. LETTER FROM S. R. SAPIRIE (AEC) TO C. E. LARSON (UCC).," (U), 1966, JUNE 22, DRAWER 17, M-784
(WRITE-OFF INSTRUCTIONS GIVEN.)

(97)

KELLER, C. A., "MEMO OF AGREEMENT BETWEEN GSA AND AEC. LETTER FROM C. A. KELLER (AEC) TO R. F. HIBBS (UCC).," (U), 1966, JUNE 27, DRAWER 17, M-389
(AGREEMENT COVERS STORAGE, HANDLING, AND RELATED SERVICES IN CONNECTION WITH MERCURY STORED FOR GSA)

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HIBBS, R. F., "LAND BURIAL OF RADIOACTIVE WASTES. LETTER FROM R.F. HIBBS (UCC) TO C.A. KELLER (AEC).," (U), 1966, JULY 5, DRAWER 17, M-464
(VOLUME OF RADIOACTIVE WASTE, NO.1 BURIAL GROUND AT Y-12 FOR PERIOD JAN. 1, 1966 THROUGH JUNE 30, 1966.)

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HOLLINGSWORTH, R. E., "LOSS OF MERCURY AT Y-12 PLANT. LETTER FROM R. E. HOLLINGSWORTH (AEC) TO S. R. SAPIRIE (AEC).," (U), 1966, JULY 5, DRAWER 17,
M-760
(SEQUENCE OF OPERATING ERRORS. CONCERN EXPRESSED.)

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LARSON, C. E., "LOSS OF MERCURY AT THE Y-12 PLANT. LETTER FROM C. E. LARSON (UCC) TO S. R. SAPIRIE (AEC).," (U), 1966, JULY 19, DRAWER 17, M-760

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(VOLUME OF RADIOACTIVE WASTE, NO.1 BURIAL GROUND AT Y-12 FOR PERIOD JULY 1, 1966 THROUGH DEC. 31, 1966.)

(103)

AEC, "CONSTRUCTION PROJECT DATA SHEET - AIR AND WATER POLLUTION CONTROL - Y-12 PLANT," (U), 1967, JUNE, DRAWER 17, M-462
(CONTROL LIQUID EFFLUENTS FROM LITHIUM FACILITIES.)

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KELLER, C. A., "TRANSFER IN-PLACE OF MERCURY TO GSA, LETTER FROM C. A. KELLER (AEC) TO R. F. HIBBS (UCC)," (U), 1966, MAY 6, DRAWER 17, M-389 (AUTHORIZES TRANSFER OF ~~20,000~~ FLASKS.)

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SAPIRIE, S. R., "REPORT OF INVESTIGATING COMMITTEE - LOSS OF MERCURY AT THE Y-12 PLANT. LETTER FROM S. R. SAPIRIE (AEC) TO C. E. LARSON (UCC)," (U), 1966, MAY 13, DRAWER 17, M-744 (RECOMMENDATIONS OF COMMITTEE. EFFECTS OF SPILL LOSS.)

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KELLER, C. A., "MEMO OF AGREEMENT BETWEEN GSA AND AEC, LETTER FROM C. A. KELLER (AEC) TO R. F. HIBBS (UCC)," (U), 1966, JUNE 27, DRAWER 17, M-389 (AGREEMENT COVERS STORAGE, HANDLING, AND RELATED SERVICES IN CONNECTION WITH MERCURY STORED FOR GSA)

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KELLER, C. A., "AUTHORIZATION TO RELEASE ~~20,000~~ FLASKS OF MERCURY TO GSA, LETTER FROM C. A. KELLER (AEC) TO R. F. HIBBS (UCC)," (U), 1966, DECEMBER 28, DRAWER 17, M-389 (ALSO M-384)

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HIBBS, R. F., "LAND BURIAL OF RADIOACTIVE WASTES, LETTER FROM R.F. HIBBS (UCC) TO C.A. KELLER (AEC)," (U), 1967, JANUARY 9, DRAWER 17, M-464 (VOLUME OF RADIOACTIVE WASTE, NO.1 BURIAL GROUND AT Y-12 FOR PERIOD JULY 1, 1966 THROUGH DEC. 31, 1966.)

(103)

AEC, "CONSTRUCTION PROJECT DATA SHEET - AIR AND WATER POLLUTION CONTROL - Y-12 PLANT," (U), 1967, JUNE, DRAWER 17, M-462 (CONTROL LIQUID EFFLUENTS FROM LITHIUM FACILITIES.)

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CASE, J. M., "LAND BURIAL OF RADIOACTIVE WASTES, LETTER FROM J.M. CASE (UCC) TO C.A. KELLER (AEC)," (U), 1967, JULY 14, DRAWER 17, M-464 (VOLUME OF RADICATIVE WASTE, NO.1 BURIAL GROUND AT Y-12 FOR PERIOD JAN. 1, 1967 THROUGH JUNE 30, 1967.)

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CASE, J. M., "LAND BURIAL OF RADIOACTIVE WASTES, LETTER FROM J.M. CASE (UCC) TO C.A. KELLER (AEC)," (U), 1968, JANUARY 5, DRAWER 17, M-464 (VOLUME OF RADICATIVE WASTE, NO.1 BURIAL GROUND AT Y-12 FOR PERIOD JULY 1, 1967 THROUGH DEC. 31, 1967.)

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KELLER, C. A., "REQUEST FOR ESTIMATE FOR FLASKING 15,764 FOR TRANSFER TO GSA FOR SALE, LETTER TO J.M. CASE (UCC) FROM C.A. KELLER (AEC)," (U), 1968, JANUARY 17, DRAWER 17, M-384
(THIS IS FOR THE PORTION "STILL IN THE PROCESS SYSTEM".)

(107)

KELLER, C. A., "GSA MERCURY PALLETS, LETTER TO J. M. CASE (UCC), FROM C. A. KELLER (DOE)," (U), 1968, JANUARY 17, DRAWER 17, M-393

(108)

CASE, J. M., "FLASKING MERCURY, LETTER FROM J. M. CASE (UCC) TO C. A. KELLER (AEC)," (U), 1968, FEBRUARY 9, DRAWER 17, M-784
(PLANS FOR WITHDRAWAL OF MERCURY FROM ALPHA-4)

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KELLER, C. A., "MERCURY FLASKING REQUEST (15,764 FLASKS), LETTER TO J. M. CASE (UCC) FROM C. A. KELLER (AEC)," (U), 1968, MARCH 5, DRAWER 17, M-384

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KELLER, C. A., "GSA MERCURY PALLETS, LETTER TO J. M. CASE (UCC), FROM C. A. KELLER (AEC)," (U), 1968, MARCH 5, DRAWER 17, M-393

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KELLER, C. A., "FLASKING OF MERCURY, LETTER FROM C. A. KELLER (AEC) TO J. M. CASE (UCC)," (U), 1968, MARCH 5, DRAWER 17, M-784
(APPROVAL TO FLASK MERCURY STILL IN THE PROCESS SYSTEM)

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CASE, J. M., "LAND BURIAL OF RADIOACTIVE WASTES, LETTER FROM J.M. CASE (UCC) TO JOSEPH LENHARD AND HOWARD HEACKER (AEC)," (U), 1968, AUGUST 6, DRAWER 17, M-464
(VOLUME OF RADIOACTIVE WASTE, NO.1 BURIAL GROUND AT Y-12 FOR PERIOD JAN. 1, 1968 THROUGH JUNE 30, 1968.)

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CASE, J. M., "MERCURY INVENTORY LOSS, LETTER FROM J. M. CASE (UCC) TO C. A. KELLER (AEC)," (C), 1968, AUGUST 26, DRAWER 17, M-784
(EARLY ESTIMATES OF LOSSES WERE UNDERSTATED. (ALSO M-760))

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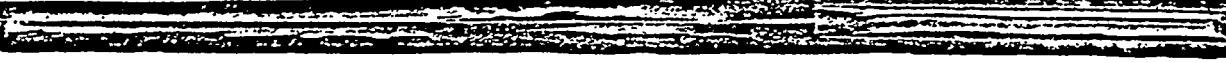
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(PLANS FOR WITHDRAWAL OF MERCURY FROM ALPHA-4)

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 (SHORTAGE OF MERCURY AND AMOUNT AUTHORIZED TO BE WRITTEN OFF.)

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KELLER, C. A., "USES OF LI-7, LETTER FROM C. A. KELLER (AEC) TO J. M. CASE (UCC).," (U), 1968, DECEMBER 19, DRAWER 17, M-480
 (ASKS FOR INFORMATION ON LITHIUM SEPARATION IN CONNECTION WITH ECONOMIC EVALUATIONS OF MOLTEN SALT REACTOR)

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KELLER, C. A., "STUDY OF MERCURY INVENTORY REQUIREMENTS, LETTER FROM C. A. KELLER (AEC) TO P. R. VANSTRUM (UCC).," ORO147469, (S), 1969, AUGUST 12, DRAWER 17, M-218
 (NUMERICAL DATA ON MERCURY INVENTORY REQUIRED FOR STARTUP OF ALPHA-4 (ALSO M-481))

(118)

VANSTRUM, P. R., "STUDY OF MERCURY INVENTORY REQUIREMENTS, LETTER FROM P. R. VANSTRUM (UCC) TO C. A. KELLER (AEC).," UCC-ND-87, (S), 1969, SEPTEMBER 5, DRAWER 17, M-216
 (PRODUCTION CAPABILITY OF ALPHA-4 EXAMINED IN VARIOUS OPERATING MODES.)

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(120)

KELLER, C. A., "MERCURY FLASKS, LETTER TO J. M. CASE (UCC), FROM C. A. KELLER, (AEC).," (U), 1969, SEPTEMBER 30, DRAWER 17, M-393
 (FLASKS)

(121)

KELLER, C. A., "MERCURY TO BE RELEASED TO GSA, LETTER FROM C. A. KELLER (AEC) TO J. M. CASE (UCC).," (U), 1969, SEPTEMBER 30, DRAWER 17, M-784
 (AUTHORIZATION FOR FLASING OF MERCURY FOR TRANSFER TO GSA)

(122)

(NO AUTHOR), "CORRESPONDENCE ON ENVIRONMENTAL PROTECTION FOR 1971," (C), 1971, DRAWER 17, M-459
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KELLER, C. A., "USES OF LI-7, LETTER FROM C. A. KELLER (AEC) TO J. M. CASE (UCC).," (U), 1968, DECEMBER 19, DRAWER 17, M-480
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(PRODUCTION CAPABILITY OF ALPHA-4 EXAMINED IN VARIOUS OPERATING MODES.)

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KELLER, C. A., "MERCURY TO BE TRANSFERRED TO GSA FOR DISPOSAL, LETTER FROM C. A. KELLER (AEC) TO J. M. CASE (UCC).," (U), 1969, SEPTEMBER 30, DRAWER 17, M-481
(15,000 FLASKS OF MERCURY IN PROCESS SYSTEM TO BE TRANSFERRED TO GSA.
(ALSO M-384))

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KELLER, C. A., "MERCURY FLASKS, LETTER TO J. M. CASE (UCC), FROM C. A. KELLER, (AEC).," (U), 1969, SEPTEMBER 30, DRAWER 17, M-393
(FLASKS)

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KELLER, C. A., "MERCURY TO BE RELEASED TO GSA, LETTER FROM C. A. KELLER (AEC) TO J. M. CASE (UCC).," (U), 1969, SEPTEMBER 30, DRAWER 17, M-784
(AUTHORIZATION FOR FLASKING OF MERCURY FOR TRANSFER TO GSA)

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(POLLUTION CONTROL)

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(123)

KELLER, C. A., "TENNESSEE AIR POLLUTION CONTROL REGULATIONS - LAND AREA CLASSIFICATION FOR ANDERSON COUNTY & A PORTION OF RCANE COUNTY, LETTER FROM C. A. KELLER (AEC) TO P. R. VANSTRUM (UCC)," (C), 1971, APRIL 25, DRAWER 17, M-459
(ANDERSON & RCANE COUNTY CONTROL REGULATIONS)

(124)

CORNWELL, G. H., "TENNESSEE AIR POLLUTION CONTROL REGULATIONS, LETTER FROM J. H. CORNWELL (TN PUBLIC HEALTH DEPT.) TO D. R. MCCAMMON (UCC)," (C), 1971, APRIL 05, DRAWER 17, M-459
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(125)

BILES, M. B., "EXTENSION OF THE REFUSE ACT OF 1899 TO REQUIRE PERMITS FOR LIQUID WASTE DISCHARGES FROM FEDERAL FACILITIES, LETTER TO AEC, FROM M. B. BILES (AEC)," (C), 1971, MAY 7, DRAWER 17, M-459

(126)

CASE, J. M., "FY-1971 ANNUAL PROGRESS REPORT ON AIR AND WATER POLLUTION ABATEMENT PROJECTS, LETTER TO C. A. KELLER, (AEC), FROM J. M. CASE (UCC)," (C), 1971, MAY 10, DRAWER 17, M-459

(127)

KELLER, C. A., "MERCURY REQUIREMENTS, LETTER TO J. M. CASE (UCC) FROM C. A. KELLER (AEC)," (U), 1971, MAY 25, DRAWER 17, M-393

(128)

WILCOX, W. J., "WASTE MANAGEMENT AND POLLUTION CONTROL BRANCH, LETTER TO J. F. WING, (AEC), FROM W. J. WILCOX (UCC)," (C), 1971, JUNE 2, DRAWER 17, M-459
(POLLUTION CONTROL)

(129)

AEC, "APPLICATIONS FOR LIQUID WASTE DISCHARGE PERMITS FROM THE CORPS OF ENGINEERS, LETTER TO MANAGERS OF AEC FIELD OFFICES, FROM AEC," (C), 1971, JUNE 3, DRAWER 17, M-459

(130)

SAPIRIE, S. R., "APPLICATIONS FOR LIQUID WASTE DISCHARGE PERMITS FROM THE CORPS OF ENGINEERS, LETTER FROM S. R. SAPIRIE (AEC) TO R. F. HIBBS (UCC)," (U), 1971, JUNE 10, DRAWER 17, M-459

(131)

SAPIRIE, S. R., "WATER EFFLUENT DATA, LETTER FROM S. R. SAPIRIE (AEC) TO E. JENSEN (EPA)," (C), 1971, SEPTEMBER 28, DRAWER 17, M-459

(132)

KELLER, CHARLES A., "PARTICIPATION IN ENGINEERING FOUNDATION CONFERENCE, LETTER FROM CHARLES A. KELLER (AEC) TO J. M. CASE (UCC)," (U), 1971, OCTOBER 15, DRAWER 17, M-477
(H. T. KITE, UNCLASSIFIED PAPER ON CONTROL OF MERCURY VAPOR.)

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(133)

CASE, J. M., "FABRICATION AND ASSEMBLY AREA ENVIRONMENTAL CONTROL REQUIREMENTS. LETTER FROM J. M. CASE (UCC) TO C. A. KELLER (AEC).," (C), 1971, DECEMBER, DRAWER 17, M-459

(134)

KELLER, C. A., "CUSHIONING MATERIAL FOR PACKAGING SHIPMENTS. LETTER FROM C. A. KELLER (AEC) TO J. M. CASE (UCC).," (C), 1971, DECEMBER 26, DRAWER 17, M-459

(135)

HIBBS, R. F., "FUNDING FOR SELECTED ENVIRONMENTAL ACTIVITIES. LETTER FROM R. F. HIBBS (UCC) TO S. R. SAPIRIE (AEC).," (C), 1971, DECEMBER 07, DRAWER 17, M-459

(136)

RUCKELSHAUS, WM. D., "SURVEY OF USAGE AND DISPOSAL OF MERCURY. LETTER FROM WILLIAM D. RUCKELSHAUS (EPA) TO W. F. FULKERSON (UCC).," (U), 1971, DECEMBER 22, DRAWER 17, M-458
(FULKERSN'S EFFCRTS ENDORSED.)

(137)

CASE, J. M., "COMMENTS ON EPA PROPOSED NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS. LETTER FROM J. M. CASE (UCC) TO C. A. KELLER (AEC).," (U), 1972, FEBRUARY, DRAWER 17, M-458
(EPA STANDARDS FOR MERCURY. MERCURY RELEASE LIMITS AT Y-12.)

(138)

TRAIN, RUSSELL E., "SURVEY OF USAGE AND DISPOSAL OF MERCURY. LETTER FROM RUSSELL E. TRAIN (EPA) TO W. F. FULKERSON (UCC).," (U), 1972, FEBRUARY 9,
DRAWER 17, M-458
(FULKERSN'S EFFCRTS ENDORSED.)

(139)

TN DP PUB HEALTH, "EMISSION REDUCTION PLANS FOR EMERGENCY EPISODES. LETTER FROM STATE OF TENN. TO S. R. SAPIRIE (AEC).," (U), 1972, FEBRUARY 11, DRAWER 17, M-458
(SPECIFIES REPORTING REQUIREMENTS.)

(140)

SAPIRIE, S. R., "EFFLUENT REDUCTION PROGRAM - PHASE II. LETTER FROM S. R. SAPIRIE (AEC) TO R. F. HIBBS (UCC).," (U), 1972, FEBRUARY 16, DRAWER 17, M-458
(CONTAMINATION OF ONSITE AND OFFSITE LAND AREAS. RADIONUCLIDES.)

(141)

HART, R. J., "TENNESSEE AIR POLLUTION EMISSION REDUCTION PLANS. LETTER FROM R. J. HART (AEC) TO R. F. HIBBS (UCC).," (U), 1972, MARCH 10, DRAWER 17, M-458

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TN DP PUB HEALTH, "AIR POLLUTION CONTROL REGULATIONS. LETTER FROM STATE OF TENNESSEE TO S. R. SAPIRIE (AEC).," (U), 1972, MARCH 14, DRAWER 17, M-458
(TENN. AIR POLLUTION CONTROL REGULATIONS.)

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(143)

HART, R. J., "BUDGET - ENVIRONMENTAL DATA FOR FY-1974 LETTER FROM R. J. HART (AEC) TO R. F. HIBBS (UCC)," (U), 1972, MARCH 24, DRAWER 17, M-458

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 (IMPACT OF PCB POLLUTION (LETTER OF CAUTION RE ACCIDENTAL CONTAMINATION)
 FILE NOTATION OF FURTHER CORRESPONDENCE BETWEEN HIBBS AND MCNSANTO.)

(145)

HIBBS, R. F., "TENNESSEE AIR POLLUTION EMISSION REDUCTION PLANS, LETTER FROM R. F. HIBBS (UCC) TO R. J. HART (AEC)," (U), 1972, MAY 11, DRAWER 17, M-458
 (CONTROL ACTIONS.)

(146)

CASE, J. M., "FY 1972 ANNUAL PROGRESS REPORT ON AIR AND WATER POLLUTION ABATEMENT PROJECTS, LETTER FROM J. M. CASE (UCC) TO H. D. HICKMAN (AEC)," (U), 1972, MAY 24, DRAWER 17, M-458
 (POLLUTING DISCHARGE. REQUIREMENTS OF STANDARDS.)

(147)

ROSS, DONALD M., "DECLASSIFICATION OF HEALTH AND SAFETY DATA RELATED TO MERCURY EXPOSURES IN Y-12, LETTER FROM D. M. ROSS (AEC) TO C. F. KNESEL (AEC)," (U), 1972, JUNE 27, DRAWER 17, M-477
 (HEALTH AND SAFETY DATA ON MERCURY WORKERS IN Y12 DURING LATE 50'S AND EARLY 60'S.)

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(148)

PRESIDENT, UCC, "ESTABLISHMENT OF CORPORATE INFORMATION CONTROL CENTER, LETTER FROM UCC HEADQUARTERS TO EXECUTIVE LIST," (U), 1972, JUNE 30, DRAWER 17, M-458
 (CORPORATE ENVIRONMENTAL INFORMATION COMMITTEE.)

(149)

NEEF, MELVIN E., "DECLASSIFICATION OF HEALTH AND SAFETY DATA RELATED TO MERCURY EXPOSURES IN Y-12, LETTER FROM MELVIN E. NEEF (AEC) TO L. R. MICHENNER, CLASSIFICATION OFFICER, O R.," (U), 1972, JUNE 30, DRAWER 17, M-477
 (NEWELL BCLTON (ORNL). TABERSHAW AND COOPER. RELEASE OF DATA.)

(150)

HIBBS, R. F., "RADIOACTIVE EFFLUENT DATA REPORT, LETTER FROM R. F. HIBBS (UCC) TO R. J. HART (AEC)," (U), 1972, JULY 3, DRAWER 17, M-458
 (USAEC LIQUID AND AIRBORNE RADIOACTIVE EFFLUENT DATA (CY 1971) FOR ORNL, ORGDP, Y12 AND PGDP.)

(151)

HICKMAN, H. D., "STORAGE, HANDLING, RELATED SERVICE FOR GSA, LETTER TO J. M. CASE (UCC), FROM H. D. HICKMAN (AEC)," (U), 1972, JULY 13, DRAWER 17, M-393
 (STORAGE & HANDLING)

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 (AGENDA OF SPECIFIC ABATEMENT PROBLEMS AT AEC FACILITIES (OCT. 25, 26, 27, 1972).)

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 (DUAL RESPONSIBILITY OF GOOD SECURITY AND PROGRESSIVE ENVIRONMENTAL PROTECTION ACTION.)

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TRAVIS, WILLIAM H., "1972 ENVIRONMENTAL MANAGEMENT APPRAISAL CRGDP, Y12, ORNL. LETTER FROM WILLIAM TRAVIS (AEC) TO R. G. JORDAN (UCC)," (U), 1972, SEPTEMBER 12. DRAWER 17, M-458
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 (APPROVAL OF EMISSION REDUCTION PLAN BY TENN. DIV. OF AIR POLLUTION CONTROL.)

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(QUALITY OF MERCURY SOLD. REFLASKING GSA MATERIAL. LEAKING FLASKS. BOTTLING COSTS)
- (172) LAWRENCE, J. B., "QUALITY OF MERCURY SOLD. LETTER FROM J.B. LAWRENCE (BETHLEHEM APPARATUS CO.) TO G. GARTH (ASSOC. METALS).," (U), 1974, MAY 9,
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- (174) GARNER, L. J., "MERCURY PURITY. LETTER FROM LEON J. GARNER (AEC) TO A.L. MAYFIELD (AEC).," (U), 1974, MAY 31, DRAWER 17, M-81
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- (176) BIAGIOTTI, L. A., "WAREHOUSING AND SHIPMENT OF GSA-OWNED MERCURY. LETTER TO H. D. HICKMAN (UCC) FROM L. A. BIAGIOTTI (AEC).," (U), 1974, JUNE 11, DRAWER 17, M-422
- (177) BIAGIOTTI, L. A., "WAREHOUSING AND SHIPMENT OF GSA-OWNED MERCURY. MEMO TO FILE (DOE). FROM L. A. BIAGIOTTI (DOE).," (U), 1974, JUNE 11, DRAWER 17.
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HICKMAN, H. D., "REFLASKING OF GSA MERCURY. LETTER FROM H. D. HICKMAN (AEC) TO J. M. CASE (UCC).," (U), 1974, OCTOBER 11, DRAWER 17, M-220
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(INSPECTION OF FLASKS CARBIDE REFUSES TO SHIP BECAUSE OF LEAKING CONDITIONS)

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 (ADDITIONAL INFORMATION ON REFLASKING AND STORAGE OF MERCURY FLASKS AUTHORIZED IN GSA LETTER OF OCTOBER 23, 1974 (ALSO M-81))

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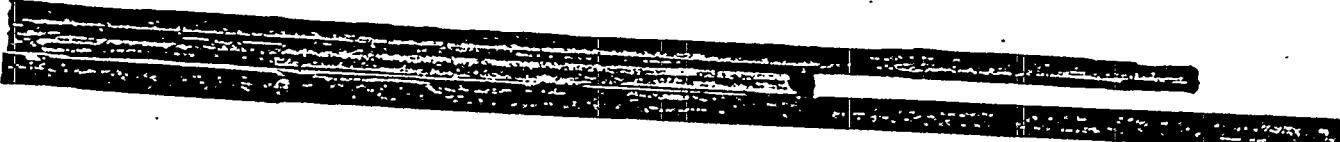
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(ERDA ALLOCATION OF FUNDS AND CONDITIONS. (ALSO M-382))

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(AMOUNTS OF FLASKED MERCURY TO BE STORED AT Y-12)

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(LITHIUM ISOTOPE SEPARATION FACILITY. MERCURY STORAGE. (ALSO M-393, -422, -783))

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(ERDA DECLARED 6,000 FLASKS OF MERCURY EXCESS. (ALSO M-389, -393, -422))

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(Y-12 TO DOCUMENT SAFETY ANALYSIS OF MERCURY HANDLING OPERATION. (ALSO M-391, -422))

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(UCC/ERDA MEETING CONCERNING A MORE DETAILED SPECIFICATION FOR QUALITY OF FLASK IN LONG-TERM STORAGE. (ALSO M-422, -783))

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(MERCURY STORAGE PROCEDURES. PREVENTION OF MERCURY RELEASE THROUGH CONTAMINATED WATER. (ALSO M-422, -760))
- (218) WING, J. F., "FLASKING AND STORAGE PROCEDURES, LETTER FROM J.F. WING (ERDA) TO J.T. CONSIGLIO (GSA)," (U), 1976, JULY 28, DRAWER 17, M-391
(PROCEDURE FOR STORAGE & FLASKING OF GSA OWNED MERCURY AT UCC. (ALSO 4-760, -783))
- (219) HIBBS, R. F., "FLASKING MERCURY, LETTER FROM R. F. HIBBS (UCC) TO R. J. HART (ERDA)," (U), 1976, JULY 28, DRAWER 17, M-220
(INFO ON MERCURY FLASKING IN ALPHA-4. (ALSO 4-393, -796))
- (220) CASE, J. M., "EXCESSING OF MERCURY FOR DISPOSAL BY GSA, LETTER TO H. D. HICKMAN (ERDA), FROM J. M. CASE (UCC)," (U), 1976, JULY 28, DRAWER 17, M-393
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- (221) TYL, E., "STATUS OF MERCURY INVENTORY," (C), 1976, SEPT. 30-1977, SEPT. 30, DRAWER 17, M-220
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- (222) ERDA, "ERDA RECEIVING REPORTS FOR MERCURY FROM GSA," (U), 1977, DRAWER 17, M-220
- (223) HICKMAN, H. D., "PREOPERATIONAL REVIEW - MERCURY FLASKING, LETTER FROM H. D. HICKMAN (ERDA) TO J. M. CASE (UCC)," (U), 1977, JANUARY 7, DRAWER 17, M-796
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- (224) ERDA, "ERDA PROPERTY TRANSFER ORDER OF MERCURY TO GSA," (U), 1977, MARCH 14, DRAWER 17, M-220
- (225) WING, J. F., "REPORT ON CONTAMINATION IN POPLAR CREEK AND THE CLINCH RIVER, LETTER FROM J. F. WING (ERDA) TO JERRY ELWOOD (UCC)," (U), 1977, APRIL 22, DRAWER 17, M-843
- (226) WING, J. F., "MERCURY IN FISH IN POPLAR CREEK, LETTER FROM J. F. WING (ERDA) TO W. H. TRAVIS (SAFETY AND ENVIRON. CONTROL)," (U), 1977, MAY 6, DRAWER 17, M-744
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- (227) DUPONT COMPANY, "SHIPPING ORDER FOR MERCURY FROM DOE TO SAVANNAH RIVER PLANT." (U), 1977, MAY 12, DRAWER 17, M-220
- (228) ERDA, "ERDA PROPERTY DISPOSITION INSTRUCTIONS/TRANSFER REQUEST FOR MERCURY TO SAVANNAH RIVER PLANT. (NO. 77-9)," (U), 1977, MAY 17, DRAWER 17, M-220
- (229) CASE, J. M., "MERCURY INVENTORY AT Y12 PLANT 1950 THROUGH 1977. LETTER FROM J. M. CASE TO H. D. HICKMAN," Y/AD-428, (S), 1977, JUNE 9, DRAWER 17, M-477
Attachments
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 ESTIMATED MERCURY LOSSES IN CREEK WATERS 1955 THROUGH 1975.)
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- (231) HICKMAN, H. D., "EXTENSION OF THE GSA AGREEMENT, LETTER TO J. M. CASE. (UCC), FROM H. D. HICKMAN (UCC)," (U), 1977, OCTOBER 19, DRAWER 17, M-393
- (232) HICKMAN, H. D., "COPY OF AMENDMENT #10 TO MOU #GS-COP-23195(SCM), LETTER TO J. M. CASE (UCC) FROM H. D. HICKMAN (ORO)," (U), 1978, JANUARY 25, DRAWER 17, M-393
- (233) HICKMAN, H. D., "EXCESSING OF MERCURY FOR DISPOSAL BY GSA, LETTER FROM H. D. HICKMAN (DCE) TO J. M. CASE (UCC)," (U), 1978, MARCH 10, DRAWER 17, M-220
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- (234) CASE, J. M., "EXCESSING OF MERCURY FOR DISPOSAL BY GSA, LETTER FROM J. M. CASE (UCC) TO H. D. HICKMAN (AEC)," (U), 1978, APRIL 7, DRAWER 17, M-76C
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- (238) BUTLER, R. A., "ADDITIONAL MERCURY QUANTITIES AT Y-12, LETTER FROM R. A. BUTLER (DOE) TO BUDGET DIVISION (UCC).," (U), 1978, AUGUST 29, DRAWER 17, M-229
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- (239) MAYFIELD, A. L., "MOU BETWEEN AEC & GSA: STORAGE & HANDLING OF MERCURY AND LITHIUM, MEMO TO D. McMURRAY (UCC) FROM A. L. MAYFIELD (DOD),," (U), 1978, DECEMBER 6, DRAWER 17, M-393
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- (240) HICKMAN, H. D., "EXCESS MERCURY (7000 FLASKS) FOR CSA STOCKPILE STORAGE, LETTER FROM H. D. HICKMAN (AEC) TO J. M. CASE (UCC).," (U), 1979, FEBRUARY 6, DRAWER 17, M-349
(ID TAGS FOR SUBJECT MERCURY)
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- (242) [REDACTED]
- (243) [REDACTED]
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 (CHANGES DESIGNATION OF STOCKPILE MERCURY FROM USS TO NDS)

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 (CHANGE IN ACCOUNTING FOR MERCURY REVENUE FROM SALE BY GSA (INCLUDES INSTRUCTIONS ON ACCOUNTING FOR FUTURE MERCURY SHIPMENTS FROM Y-12))

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 (HANDLING AND STORAGE OF MERCURY IN NATIONAL DEFENSE STOCKPILE AND LITHIUM HELD IN GSA INVENTORY FOR DISPOSAL)

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- (248) HICKMAN, H. D., "DOE-OWNED MERCURY FOR SALE BY GSA, LETTER FROM H. D. HICKMAN (DOE) TO J. M. CASE (UCC)," (U), 1980, JANUARY 31, DRAWER 17, M-220
(INFO ON GSA REQUEST FOR IN-PLACE TRANSFER OF ADDITIONAL 45,000 FLASKS OF EXCESS MERCURY)
- (249) CASE, J. M., "DOE-OWNED MERCURY FOR SALE BY GSA, LETTER FROM J. M. CASE (UCC) TO H. D. HICKMAN (DOE)," (U), 1980, FEBRUARY 25, DRAWER 17, M-220
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- (250) CASE, J. M., "PURITY OF MERCURY (45,000 FLASKS) TO BE TRANSFERRED TO GSA, LETTER TO H. D. HICKMAN (DOE) FROM J. M. CASE (UCC)," (U), 1980, MARCH 12, DRAWER 17, M-340
(SPECTROGRAPHIC ANALYSES)
- (251) CASE, J. M., "DOE-OWNED MERCURY FOR SALE BY GSA, LETTER TO H. D. HICKMAN (DOE) FROM J. M. CASE (UCC)," (U), 1980, MARCH 12, DRAWER 17, M-393
- (252) OSTER, H. S., "ACCOUNTING FOR THE SALE OF EXCESS MERCURY BY GSA, LETTER FROM H. S. OSTER (DOE) TO G. A. RISER (UCC)," (U), 1980, JULY 23, DRAWER 17, M-220
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- (253) OSTER, H. S., "SALE OF EXCESS MERCURY BY GSA, LETTER TO G. A. RISER (DOE) FROM H. S. OSTER, JR. (UCC)," (U), 1980, JULY 23, DRAWER 17, M-310
- (254) CASE, J. M., "MERCURY STORAGE, HANDLING & RELATED SERVICES, MCU GS-00P-23195, LETTER TO H. D. HICKMAN (DOE) FROM J. M. CASE (UCC)," (U), 1980, NOVEMBER 21, DRAWER 17, M-369
- (255) (NO AUTHOR), "AMENDMENT 13 TO AGREEMENT NO. GS-00P-23195(SCM) BETWEEN GSA AND DOE," (U), 1981, MARCH 16, DRAWER 17, M-220
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- (256) HICKMAN, H. D., "COPIES OF AMENDMENT NO. 13 TO M.O.U. NO. GS-000-23195, LETTER TO J. M. CASE (UCC) FROM H. D. HICKMAN (DOE)," (U), 1981, APRIL 2, DRAWER 17, M-382

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(CONCERNING PENDING RENEWAL AGREEMENT)
- (258) CASE, J. M., "MERCURY STORAGE, HANDLING & RELATED SERVICES, LETTER TO H.D. HICKMAN (DOE) FROM J.M. CASE (UCC)," (U), 1981, SEPTEMBER 21, DRAWER 17, M-316
(RE RENEWAL OF AGREEMENT FOR FY-82)
- (259) HICKMAN, H. D., "MERCURY INVENTORY ADJUSTMENT, LETTER FROM H. D. HICKMAN (DOE) TO J. M. CASE (UCC)," (U), 1981, OCTOBER 1, DRAWER 17, M-220
(INCREASE IN RECORDED VALUE (IN DOLLARS) OF EXCESS MERCURY AT Y-12)
- (260) GSA, "STOCKPILE INFORMATION NOTICE FROM GSA ON SALE OF MERCURY FLASKS," (U), 1981, OCTOBER 26, DRAWER 17, M-221
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- (261) GSA, "GSA NEWS RELEASE. AWARD OF CONTRACT FOR SALE OF DOE MERCURY," (U), 1981, OCTOBER 26, DRAWER 17, M-393
- (262) HICKMAN, H. D., "AMENDMENT NO. 14 TO M.O.U. GS-00P-23195, LETTER TO J. M. CASE (UCC) TO H. D. HICKMAN (DOE)," (U), 1981, DECEMBER 2, DRAWER 17, M-382
- (263) CONSIGLIO, J. T., "MEMO OF AGREEMENT NO. GS-00P-23195, LETTER TO C. H. DURHAM (DOE) FROM J. T. CONSIGLIO (GSA)," (U), 1982, JANUARY 19, DRAWER 17, M-382
- (264) GOUGH, LARRY, "DICTATED BY PHONE TO S. B. GOUGH (ORNL) FROM LARRY GOUGH (U.S. GEOLOGICAL SERVICE)," (U), 1982, FEBRUARY 7, DRAWER 17, M-319
(ANALYSIS OF AQUATIC BRYOPHYTES ALONG BEAR CREEK AND E. FORK POPLAR CREEK DEC. 5, 1981)
- (265) HICKMAN, H. D., "EXTENSION OF AGREEMENT, LETTER TO G.G. FEE (UCC) FROM H.D. HICKMAN (DOE)," (U), 1982, OCTOBER 8, DRAWER 17, M-369
- (266) WING, J. F., "SUBMISSION OF DOE ACQUIRED DATA RELATING TO METALS, LETTER FROM J. F. WING (DOE) TO DAVID MCKINNEY (TENN. DEPT. OF PUBLIC HEALTH)," (U), 1982, OCTOBER 26, DRAWER 17, M-744
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 (ORNL/CF-82/257, RECOMMENDATIONS OF REPORT AND ACTION TAKEN.)
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- (270)
 (NO AUTHOR), "NOTICE OF NONCOMPLIANCE, Y-12 PLANT COMPLIANCE EVALUATION INSPECTION, LETTER FROM TENN. DEPT. OF PUBLIC HEALTH." (U), 1983, MARCH 8, DRAWER 17, M-744
 (APPLICABLE POLLUTION STANDARDS, BUREAU OF NATIONAL AFFAIRS, INC.)
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 (ATTACHMENT: APPROACH TO STRIPPING 9201-4 (OBJECTIVES AND PLAN))
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 FOUTCH, JAMES L., "MEMORANDUM OF UNDERSTANDING BETWEEN DOE AND EPA AND TENN. DEPT. OF PUBLIC HEALTH." (U), 1983, MAY 9, DRAWER 17, M-744
 (COMPLIANCE WITH POLLUTION CONTROL STANDARDS AT Y-12)
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(PROCEDURE FOR URINE MONITORING PROGRAM FOR PERSONNEL)
- (2) BAUMANN, W. H., "SOLVENT URINE PROGRAM, ALLOY DIVISION, LETTER FROM W. H. BAUMANN TO C. R. KASPEREK," (U), 1953, AUGUST 26, DRAWER 17, 4-796
(URINALYSIS PLANS DETAILED)
- (3) BAUMANN, W. H., "SOLVENT LOSS FROM TRAY VENT SYSTEM, 9204-4, LETTER FROM W.H. BAUMANN TO W.K. WHITSON," (U), 1953, OCTOBER 28, DRAWER 17, M-798
(AIR SAMPLES)
- (4) STRASSER, G. A., "SCOPE OF COLEX DEVELOPMENT FACILITIES, LTR FROM G.A. STRASSER TO G.W. MITCHEL," (U), 1954, JANUARY 14, DRAWER 17, 4-812
(DETAILED DEVELOPMENT PLAN AND SCHEDULE)
- (5) BAUMANN, W. H., "SOLVENT URINE PROGRAM FOR MAINTENANCE PERSONNEL, LETTER FROM W. H. BAUMANN TO A. A. GROPP," (U), 1954, JANUARY 21, DRAWER 17, M-796
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- (6) BAUMANN, W. H., "ALLOY-AIR CONTAMINATION - ASPEN SHOP, LETTER FROM W.H. BAUMANN TO J.M. CASE," (U), 1954, AUGUST 9, DRAWER 17, M-804
(CONSIDERATION OF INHALATION AND DERMATOLOGICAL HAZARDS)
- (7) KAMMER, A. G., "PROVISION OF CLOTHING TO WORKERS POTENTIALLY EXPOSED TO MERCURY, LETTER FROM A. G. KAMMER TO J. P. MURRAY," (U), 1954, OCTOBER 6, DRAWER 17, M-427
(PROPOSAL FOR STUDY OF PART PLAYED BY CLOTHING IN PROTECTION OF WORKERS.)
- (8) MARROW, GEORGE B., "RESULTS OF VENT GAS FILTERS - BETA-4 ELEX PLANT, LETTER FROM GEORGE B. MARROW TO L.P. TWICHELL," (C), 1954, OCTOBER 13, DRAWER 17, M-797
(STUDY OF FILTER EFFICIENCY)
- (9) (NO AUTHCR), "MERCURY BOTTLING, ISSUES, TRANSFERS, AND LOSSES (1954-1983)," (C), 1954 - 1983, DRAWER 17, M-78C
(COMPILED OF DATA ON MERCURY TRANSFERS, BOTTLING, ISSUES, USAGE, HANDLING, INVENTORY, SLUDGE, LOSSES, AND ACCOUNTABILITY RECORDS)

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- (10) GOOGIN, J. M., "REPORT OF THE COMMITTEE ON ALPHA-S CONTAMINATION, LETTER FROM J.M. GOOGIN TO W.K. WHITSON, JR.," (U), 1955, MAY 12, DRAWER 17, M-796
(SURVEY OF HEALTH-AFFECTING FACTORS IN ALPHA-S)
- (11) KITE, H. T., "ALPHA-S FLOODING EXPERIMENT, LETTER FROM H.T. KITE TO H.C. MCBIRNEY," Y-B65-69, (S), 1955, OCTOBER 19, DRAWER 17, M-777
- (12) ✓ LITTLE, J. C., "MERCURY HAZARD COMMITTEE MEETING, NOVEMBER 21, 1955; REPORT BY J. C. LITTLE," (C), 1955, NOVEMBER 21, DRAWER 17, M-487
(INCREASED VENTILATION RATE)
- (13) ✓ WATERS, J. L., "SOLVENT HAZARD COMMITTEE MTG - NO. 1, LETTER FROM J. L. WATERS TO E. C. ELLIS," (C), 1955, NOVEMBER 30, DRAWER 17, M-487
(COMMITTEE MEMBERS NAMED.)
- (14) ✓ WATERS, J. L., "SOLVENT HAZARDS COMMITTEE MEETING NO. 2, NOVEMBER 28, 1955; LETTER FROM J. L. WATERS TO E. C. ELLIS," (C), 1955, NOVEMBER 5, ?
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- (15) ✓ WATERS, J. L., "SOLVENT HAZARDS COMMITTEE MEETING NO. 3, DECEMBER 5, 1955; LETTER FROM J. L. WATERS TO L. E. BURKHART," (C), 1955, DECEMBER 7, DRAWER 17, M-487
(GIVES ENGINEERING SCHEDULE OF DESIGN AND INVESTIGATION.)
- (16) ✓ LAFRANCE, L. J., "SOURCE SAMPLES FOR SOLVENT VAPOR, LETTER FROM L. J. LAFRANCE TO F. V. TILSON," (U), 1955, DECEMBER 9, DRAWER 17, M-764
(SAMPLES FROM 9201-4)
- (17) ✓ (NO AUTHOR), "SCURCE SAMPLES FOR SOLVENT VAPOR, LETTER TO F. V. TILSON," (U), 1955, DECEMBER 9, DRAWER 17, M-796
(9-PAGE LIST OF SAMPLES TAKEN IN 9201-4)
- (18) ✓ WATERS, J. L., "SOLVENT HAZARDS COMMITTEE MTG. NO. 4, DECEMBER 12, 1955; LETTER FROM J. L. WATERS TO L. E. BURKHART," (C), 1955, DECEMBER 16, DRAWER 17, M-487
- (19) ✓ MITCHEL, G. W., "TEST AT BUILDING 9201-5 TO DETERMINE EFFECT OF TEMPERATURE ON AIR CONTAMINATION IN OPERATING AREAS, LETTER FROM G. W. MITCHEL TO W. K. WHITSON, JR.," (U), 1955, DECEMBER 23, DRAWER 17, M-754

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(VENTILATION AIR CHANGES)

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TWICHELL, L. P., "TELEPHONE CONVERSATION WITH DR. W. C. GARDINER OF OLIN MATHIESON, LETTER FROM L. P. TWICHELL TO G. A. STRASSER," (U), 1955, DECEMBER 29, DRAWER 17, M-487
(VISIT TO MATHIESON'S MERCURY CELLS PLANNED. NO CASE OF MERCURIALISM OCCURRED IN THEIR HISTORY.)

(23)

(NO AUTHOR), "SOLVENT PROBLEMS - FOLDER B SOLVENT HAZARDS CORP. FILES," (C), 1955 - 1966, DRAWER 17, M-746
(AIR ANALYSIS, HG VAPORS, SOLVENT LOSSES EXHAUST, ALPHA S. DECON., DR. KEHUE VISIT TO Y-12)

(24)

(NO AUTHOR), "SOLVENT PROBLEMS - FOLDER A," (U), 1955 - 1966, DRAWER 17, M-747
(SHOWER STUDY, ALPHA 4 & 5 CORP. FILES, SOLVENT VAP., ABSORBER TRAYS, SOURCE SAMPLE ANALYSIS, TEMP EFFECT ON AIR CONTAM.)

(25)

(NO AUTHOR), "COLEX LOSSES," (C), 1955 - 1958, DRAWER 17, M-753
(COMPILED OF INTERNAL MEMORANDA ON MERCURY LOSSES)

(26)

(NO AUTHOR), "MCT SOLVENT," (C), 1955 - 1959, DRAWER 17, M-49
(COMPILED OF WORKSHEETS AND INTERNAL MEMORANDA)

(27)

(NO AUTHOR), "BETA-4 SHUTDOWN. ESTIMATED COST DRAFT," (U), 1956, DRAWER 17, M-630
(LEDGER SHEET DRAFT OF COSTS)

(28)

(NO AUTHOR), "BETA-4 PLANT, 1956," (S), 1956, DRAWER 17, M-509
(COMPILED OF CORRESPONDENCE AND ENGINEERING DRAWINGS)

(29)

PERRY, J. E., "DECONTAMINATION MEMO NO. 1 - RUBBER OVERSHOES, LETTER FROM J. E. PERRY TO W. K. WHITSON," (C), 1956, JANUARY 9, DRAWER 17, M-487
(OVERSHOES TO BE WORN IN AREAS WHERE SOLVENT IS USED.)

CORRESPONDENCE, INTERNAL

(30)

LAFRANCE, LEO J.. "SHOWER STUDY, LETTER FROM LEO J. LAFRANCE TO W. K. WHITSON, JR.," (C), 1956, JANUARY 9, DRAWER 17, M-764
 (SOLVENT VAPOR READINGS AT SKIN SURFACES BEFORE AND AFTER TAKING A SHOWER)

(31)

LAFRANCE, LEO J.. "SHOWER STUDY, LTR FROM LEO J. LAFRANCE TO W.K. WHITSON, JR.," (C), 1956, JANUARY 9, DRAWER 17, M-796
 (SOLVENT VAPOR READINGS AT SKIN SURFACE)

(32)

WATERS, J. L.. "SOLVENT HAZARDS COMMITTEE MEETING, NO. 6, JANUARY 9, 1956; LETTER FROM J. L. WATERS TO L. E. BURKHART," (C), 1956, JANUARY 13, DRAWER 17, M-487
 (OBSERVATIONS MADE FOLLOWING LARGE SPILL IN 9201-5)

(33)

PERRY, J. E.. "DECONTAMINATION MEMO NO. 2 - FLANGE GASKETS, LETTER FROM J. E. PERRY TO W. K. WHITSON," (C), 1956, JANUARY 19, DRAWER 17, M-487
 (BAN REUSE OF GASKETS IN SOLVENT OPERATING AREAS.)

(34)

PERRY, J. E.. "DECONTAMINATION MEMO NO. 3, - USE OF TOBACCO, LETTER FROM J. E. PERRY TO W. K. WHITSON," (C), 1956, JANUARY 21, DRAWER 17, M-487
 (NO FOOD, CIGARETTES, OR TOBACCO TO BE CARRIED INTO OPERATING AREAS WHERE SOLVENT IS USED.)

(35)

PERRY, J. E.. "DECONTAMINATION MEMO NO. 5 - [REDACTED] DRAIN VALVE, LETTER FROM J. E. PERRY TO W. K. WHITSON," (C), 1956, JANUARY 26, DRAWER 17, M-487
 (REDUCE SOLVENT CONTAMINATION BY ALLOWING RAFFINATE TO DRAIN TO THE FLOOR.)

(36)

WATERS, J. L.. "SOLVENT HAZARDS COMMITTEE MTG. NO. 7, JANUARY 16, 1956; LETTER FROM J. L. WATERS TO L. E. BURKHART," (C), 1956, JANUARY 23,
 DRAWER 17, M-487
 (LOWER AIR COUNT AND MERCURY SOURCE TEMPERATURES)

(37)

PERRY, J. E.. "DECONTAMINATION MEMO NO. 7 - LEAK COLLECTION BUCKETS, LETTER FROM J. E. PERRY TO W. K. WHITSON," (C), 1956, JANUARY 24, DRAWER 17, M-487
 (PARTIALLY FILLED WATER BUCKETS PREVENT SOLVENT DROPLETS FROM SPATTERING AND INHIBIT SOLVENT VAPORIZATION.)

(38)

WATERS, J. L.. "SOLVENT HAZARDS COMMITTEE MEETING, NO. 8, JANUARY 23, 1956; LETTER FROM J. L. WATERS TO L. E. BURKHART," (C), 1956, JANUARY 28,
 DRAWER 17, M-487
 (VISITED MATHIESON CHEMICAL COMPANY'S PLANT TO OBSERVE PRECAUTIONARY MEASURES EMPLOYED IN HANDLING MERCURY.)

CORRESPONDENCE, INTERNAL

(39)

WATERS, J. L., "SOLVENT HAZARDS COMMITTEE MTG. NO. 9, JANUARY 30, 1956. LETTER FROM J. L. WATERS TO L. E. BURKHART," (C), 1956, FEBRUARY 6. DRAWER 17, M-487
(EFFECT OF AMBIENT TEMPERATURE: MERCURY VAPOR SUPPRESSANT.)

(40)

PERRY, J. E., "DECONTAMINATION MEMO NO. 4A - REVISED SOLVEX AND RAFFINATE PUMP REPLACEMENT PROCEDURES. LETTER FROM J. E. PERRY TO W. K. WHITSON," (C), 1956, FEBRUARY 7, DRAWER 17, M-487
(ENSURE MINIMUM SPILLAGE BY USE OF BUCKETS OR DRIP PANS PARTIALLY FILLED WITH WATER.)

(41)

WALDROP, F. B., "DECONTAMINATION MEMO NO. 8 - CLEANING OF RUBBER SHOES AND OVERSHOES. LETTER FROM F. B. WALDROP TO W. K. WHITSON," (C), 1956, FEBRUARY 8, DRAWER 17, M-487
(DETAILS PROCEDURE FOR REMOVING SOLVENT FROM RUBBER FOOTGEAR.)

(42)

WATERS, J. L., "SOLVENT HAZARDS COMMITTEE MEETING NO. 10, FEBRUARY 7, 1956, LETTER FROM J. L. WATERS TO L. E. BURKHART," (C), 1956, FEBRUARY 10. DRAWER 17, M-487
(KEYHCE, CONSULTANT ON MERCURY, VISITED Y-12.)

(43)

PERRY, J. E., "DECONTAMINATION MEMO NO. 9 - DISMANTLING RECOMMENDATIONS FOR SOLVEX AND RAFFINATE PUMPS. LETTER FROM J. E. PERRY TO W. K. WHITSON," (C), 1956 FEBRUARY 13, DRAWER 17, M-487
(METICULOUS REMOVAL OF SOLVENT FROM PUMPS REQUIRED.)

(44)

PERRY, J. E., "DECONTAMINATION MEMO NO. 10 - RECOMMENDED USE OF VERSORB RESPIRATORS. LETTER FROM J. E. PERRY TO W. K. WHITSON," (C), 1956, FEBRUARY 13, DRAWER 17, M-487
(PERSONNEL PERFORMING CERTAIN OPERATIONS IN ALPHA 4 AND 5 SHOULD WEAR RESPIRATOR.)

(45)

LEVEY, R. P., "RECOMMENDATIONS FOR CONVERSION OF ELEX TRAYS TO COLEX TYPE TRAYS. LETTER FROM R. P. LEVEY TO NEAL DOW ET AL.," Y-865-76, (S), 1956, FEBRUARY 15, DRAWER 17, M-630
(DETAILED INFORMATION ON CONVERSION)

(46)

LAFRANCE AND GOOGIN, "VISIT OF DR. KEHOE TO THE Y-12 PLANT. LETTER FROM LEO J. LAFRANCE AND J. M. GOOGIN TO J. P. MURRAY," (C), 1956, FEBRUARY 28. DRAWER 17, M-445
(CONSULTANT SEES POTENTIALLY SERIOUS HEALTH PROBLEM IN BUILDINGS WHERE SOLVENT IS USED.)

CORRESPONDENCE, INTERNAL

(47)

PERRY, J. E., "DECONTAMINATION MEMO NO. 11 - RECOMMENDED HOUSEKEEPING PROCEDURE, LETTER FROM J. E. PERRY TO W. K. WHITSON." (C), 1956, FEBRUARY 29, DRAWER 17, M-487
 (PROCEDURES FOR GENERAL HOUSEKEEPING AND FOR CLEANING AREAS HIGHLY CONTAMINATED WITH SOLVENT.)

(48)

PERRY, J. E., "DECONTAMINATION MEMO NO. 11, RECOMMENDED HOUSEKEEPING PROCEDURE, LETTER FROM J. E. PERRY TO W. K. WHITSON." (C), 1956, FEBRUARY 29, DRAWER 17, M-764
 (PROCEDURE OUTLINED FOR HOUSEKEEPING IN ADP AREAS WHERE SOLVENT IS USED)

(49)

LITTLE, J. C., "SOLVENT LOSSES THROUGH VENTILATION EXHAUST SYSTEMS, BLDG. 9201-S, LETTER FROM J. C. LITTLE TO L. E. BURKHART." (C), 1956, MARCH 14,
 (SURVEY READINGS SHOW MERCURY LOSSES THROUGH VENTILATION EXHAUST SYSTEM OF 9201-S TOTAL 22.5 POUNDS PER DAY.)

(50)

WHITSON, W. K., "BETA-4 STANDBY STATUS, LETTER FROM W. K. WHITSON TO J. M. CASE ET AL." (U), 1956, APRIL 2, DRAWER 17, M-673
 (READY STANDBY CONDITION. CONSOLIDATED BUDGET INFO. SUMMARY OF WORK SHEETS FOR STARTUP AFTER LONG-TERM SHUTDOWN.)

(51)

ELLIS, E. C., "SHUTDOWN OF BETA-4, LETTER FROM E. C. ELLIS TO ORAL RINEHART." (U), 1956, APRIL 2, DRAWER 17, M-603
 (DISPOSITION OF COSTS)

(52)

KITE, H. T., "SPECIFICATION FOR MERCURY VAPOR RESPIRATORS, LETTER FROM H. T. KITE TO J. W. EBERT." (C), 1956, APRIL 5, DRAWER 17, M-796

(53)

HANIG, M., "OPERATION OF ADP FACILITIES FOR REDUCED PRODUCTION, LETTER FROM M. HANIG TO J. P. MURRAY." (C), 1956, APRIL 9, DRAWER 17, M-776

(54)

PERRY, J. E., "THE USE OF FLOOR SEALERS AND WAXES IN THE ADP BUILDINGS, LETTER FROM J. E. PERRY TO M. C. BAYS." (U), 1956, APRIL 16, DRAWER 17, M-796

(55)

DOW, NEAL, "BETA-4 SOLVENT, LETTER FROM NEAL DOW TO E. C. ELLIS." (U), 1956, APRIL 25, DRAWER 17, M-603
 (ALPHA-4 COLEX OPERATIONS. CHARGE CODES FOR ACCOUNTS.)

CORRESPONDENCE, INTERNAL

(56)

TWICHELL, L. P., "SPECIFICATION AND USAGE REQUIREMENTS FOR MERCURY VAPOR RESPIRATORS. LETTER FROM L. P. TWICHELL TO E. C. ELLIS." (C). 1956. MAY 16. DRAWER 17. M-487
(RESPIRATORS TO BE CAPABLE OF REMOVING MINIMUM OF 99 PERCENT OF METALLIC MERCURY VAPOR.)

(57)

TAYLOR, M. L., "COST ESTIMATES FOR STRIPPING BLDG 9204-4 PREPARED BY M. L. TAYLOR." (U). 1956. MAY 18. DRAWER 17. M-633
(STRIP BLDG 9204-4 (C.P.F.F.) SALVAGE VALUE)

(58)

(NO AUTHOR). "REASONS FOR STRIPPING BLDG 9204-4. OUTLINE DRAFT." (U). 1956. JUNE 1. DRAWER 17. M-603
(HANDWRITTEN ROUGH DRAFT. VALUE OF MATERIALS AND OTHER CONSIDERATIONS. RECOMMENDED METHODS.)

(59)

KITE, H. T., "USE AND DECONTAMINATION OF MERCURY VAPOR RESPIRATORS. LETTER FROM H. T. KITE TO J. W. EBERT." (C). 1956. JUNE 11. DRAWER 17. M-487
(RECOMMENDATIONS FOR USE OF RESPIRATORY PROTECTIVE EQUIPMENT.)

(60)

WALKER, R. A., "BUILDING 9204-4 STRIPPING PROPOSAL. LETTER FROM R. A. WALKER TO W. K. WHITSON ET AL." (U). 1956. AUGUST 1. DRAWER 17. M-603

(61)

JENNINGS, D. A., "STRIPPING OF BETA-4. LETTER FROM D. A. JENNINGS TO W. K. WHITSON." (U). 1956. AUGUST 3. DRAWER 17. M-603
(COMMENTS ON BETA-4 STRIPPING PROPOSAL.)

(62)

WHITSON, W. K., "STRIPPING OF BETA-4. LETTER FROM W. K. WHITSON TO G. S. LOCKHART." (U). 1956. AUGUST 13. DRAWER 17. M-603
(COMMENTS ON BETA-4 STRIPPING PROPOSAL.)

(63)

BLUMKIN, S-HANIG, M. "OPTIMUM FLOW RATES IN ALPHA-5. LETTER FROM S. BLUMKIN AND M. HANIG TO W. K. WHITSON." K0A-158. (S). 1956. SEPTEMBER 17. DRAWER 17. M-612
(FACTORS INVOLVED IN CHOICE OF FLOW RATE.)

(64)

WALKER, R. A., "STRIPPING OF BETA-4. LETTER FROM R. A. WALKER TO J. M. CASE ET AL." (U). 1956. SEPTEMBER 17. DRAWER 17. M-603
(DISPOSAL ON STRIPPED EQUIPMENT)

(65)

ELLIS, E. C., "STRIPPING OF BUILDING 9204-4. LETTER FROM E. C. ELLIS TO J. M. CASE ET AL." (U). 1956. SEPTEMBER 18. DRAWER 17. M-603
(ACCOUNTS FOR COSTS AND SALVAGE CREDITS)

CORRESPONDENCE, INTERNAL

(66)

[REDACTED]

(67)

ELLIS, E. C., "STRIPPING OF BLDG 9204-4, LETTER FROM E. C. ELLIS TO J. M. CASE ET AL." (U), 1956, OCTOBER 1, DRAWER 17, M-603
(METHODS OF HANDLING TRANSFER OF MATERIALS AND EQUIPMENT)

(68)

(NO AUTHOR), "Y-12 DEVELOPMENT ACTIVITIES, LTR TO W. C. MOORE," (U), 1956, NOVEMBER 11, DRAWER 17, M-796
(EFFORTS INCLUDE CONTROL OF MERCURY CONTAMINATION OF THE AIR)

(69)

EVANS, G. W., "SUPERFICIAL STUDY OF FIVE-DAY OPERATION OF ALPHA-5, LETTER FROM G. W. EVANS TO FILE," Y-F46-24, (S), 1956, DECEMBER 29, DRAWER 17, M-789

(70)

MCMILLAN, R. G., "SOLVENT AIR ANALYSES, LETTER FROM R. G. MCMILLAN TO W. C. MOORE," (C), 1957, MAY 7, DRAWER 17, M-836
(REVIEW TO DETERMINE REDUCTION IN RATE OF AIR SAMPLING)

(71)

NICELY, J. W., "REMOVAL OF MERCURY FROM NITRIC ACID WASH SOLUTIONS, LETTER FROM J. W. NICELY TO D.A. JENNINGS," (C), 1957, JUNE 11, DRAWER 17, M-787
(PROCEDURE FOR 1-STAGE REMOVAL PROCESS)

(72)

MURRAY, J. P., "DISMANTLEMENT AND DISPOSAL OF BETA-4 PLANT, PROJ. 224-57-R-1, LETTER FROM J. P. MURRAY TO ORAL RINEHART," (U), 1957, JULY 1, DRAWER 17, M-603
(COSTS INVOLVED)

(73)

EVANS, G. W., "COMPILED MERCURY-RELATED CORRESPONDENCE," (C), 1957, AUGUST 9, DRAWER 17, M-802
(SOLVENT INVENTORY)

(74)

EVANS, G. W., "SOLVENT INVENTORY, LETTER FROM G. W. EVANS TO R. A. WALKER," (C), 1957, AUGUST 9, DRAWER 17, M-79
(SUMMARY 9201-5)

(75)

REECE, JOHN S., "SUGGESTED STUDIES FOR DEVELOPMENT DIVISION, LTR FROM J. S. REECE TO R. A. WALKER," (U), 1957, OCTOBER 24, DRAWER 17, M-796
(INTENSIVE STUDY SUGGESTED ON REDUCING MERCURY LOSSES TO THE CREEK)

CORRESPONDENCE, INTERNAL

- (76) KITE, H. T., "SOLVENT INVENTORY, BUILDING 9201-2, LETTER FROM H. T. KITE TO NELSON BETHEA." (C), 1957, DECEMBER 13, DRAWER 17, M-487
(LIST OF PERIODS WHEN MAJOR LOSSES OCCURRED. NET LOSS IS 82.473 POUNDS.)
- (77) MCMILLAN, R. G., "SOLVENT AIR ANALYSES. LETTER FROM R. G. MCMILLAN TO J. D. MCLEODON," (U), 1958, APRIL 8, DRAWER 17, M-836
(RECOMMENDATION FOR REDUCTION IN FREQUENCY OF AIR MEASUREMENTS)
- (78) KITE, H. T., "A PRELIMINARY STUDY OF THE RECOVERY OF LITHIUM AND MERCURY LOSSES. LETTER FROM H.T. KITE TO N. DOW ET AL." (C), 1958, MAY 19, DRAWER 17, M-815
(NOTE TO FILE 6/21/83 BY C.D. DOTY RE MERCURY STUDY)
- (79) PERRY, J. E., "MERCURY PURIFICATION. LETTER FROM J.E. PERRY TO J.S. REECE." (C), 1958, JULY 2, DRAWER 17, M-787
(EFFECTS OF IMPURITIES IN THE COLEX PROCESS)
- (80) WEST, C. M., "COMPARATIVE STUDY OF AIR SAMPLING INSTRUMENTS. LETTER FROM C. M. WEST TO J. S. REECE." (U), 1958, SEPTEMBER 4, DRAWER 17, M-836
(STUDIES TO MONITOR SOLVENT CONCENTRATIONS IN THE AIR AT THE SLUDGE BURNER IN BLDG. 81-101)
- (81) DOW, N., "ALPHA-5 SHUTDOWN. LETTER TO R.A. WALKER FROM NEAL DOW," (U), 1959, FEBRUARY 18, DRAWER 17, M-392
(PLANS FOR PUTTING BUILDING IN STANDBY)
- (82) DEFENDERER, V., "81-10 OPERATIONS ON SOLVENT-CONTAMINATED DIRT. LETTER FROM V. DEFENDERER TO J.S. REECE." (U), 1959, MAY 15, DRAWER 17, M-797
(SUMMARY OF WORK ON SOLVENT RECOVERY FROM DIRT EXCAVATED FROM 9201-2 GROUNDS)
- (83) DOW, N., "COLEX SOLVENT INVENTORY. LETTER FROM N. DOW TO M. F. SCHWENN," (C), 1962, SEPTEMBER 6, DRAWER 17, M-76
(ALPHA-4, ALPHA-5, PHYSICAL INVENTORY 8/29/62, SHORTAGE COMMENT.)
- (84) DOW, N., "COLEX, SOLVENT INVENTORY. LETTER FROM N. DOW TO M. F. SCHWENN," (C), 1962, SEPTEMBER 6, DRAWER 17, M-800
(ALPHA-4, ALPHA-5)
- (85) DOW, NEAL, "Y-12 EXCESS MERCURY. LETTER FROM NEAL DOW TO E. C. ELLIS." (U), 1962, NOVEMBER 13, DRAWER 17, M-508
(TYPE AND PURITY LEVEL OF EXCESS MERCURY. SPECTROGRAPHIC REPORT.)

CORRESPONDENCE, INTERNAL

(86)

HIBBS, R. F., "EXCESS MERCURY. LETTER FROM R. F. HIBBS TO ORAL RINEHART." (U), NOVEMBER 21, DRAWER 17, M-508
(REPLY TO AEC ON SPECTROGRAPHIC ANALYSES)

(87)

KELLER, C. A., "LETTER FROM C. A. KELLER (AEC) TO R. F. HIBBS (UCC) TRANSMITTING A COPY OF THE DEFENSE MATERIALS SYSTEM - GSA PROCEDURE PERTINENT TO THE STORAGE OF MERCURY." (U), MARCH 29, DRAWER 17, M-41

(88)

HIBBS, R. F., "WASTE WATER DISPOSAL PRACTICES. LETTER FROM R. F. HIBBS TO J. A. SWARTOUT (CRNL)." (U), FEBRUARY 19, DRAWER 17, M-464
(USPHS QUESTIONNAIRE ON Y12 PLANT WASTE WATER DISPOSAL PRACTICES.)

(89)

GRIFFITH, W. L., "BUILDING 9201-5 STRIPPING AND STANDBY CONSIDERATIONS. LETTER FROM W. L. GRIFFITH TO J. J. CASE," Y-KH-44. (S), MARCH 13.
DRAWER 17, M-479
(PLANS TO DISPOSE OF SOLVENT)

(90)

(NO AUTHOR), "STRIPPING OF 9201-5." (U), 1965, DRAWER 17, M-781
(MISCELLANEOUS CORRESPONDENCE, MAINTENANCE WORK REQUESTS, SAFETY RECOMMENDATIONS, AND LISTS OF EMPLOYEES ON THE PROJECT)

(91)

SMITH, D. W., "MERCURY PACKAGING PROCEDURE. LETTER FROM D. W. SMITH TO R. D. WILLIAMS." (U), JANUARY 19, DRAWER 17, M-784
(INCLUDES SYSTEMATIC PLAN FOR PATROLLING MERCURY STORAGE AREAS)

(92)

JENNINGS, D. A., "PLANNING FOR STRIPPING OF BUILDING 9201-5. LETTER TO J.W. EBERT FROM D.A. JENNINGS." (U), FEBRUARY 4, DRAWER 17, M-392

(93)

WILLIAMS, R. D., "MERCURY AUDIT COMMENTS. LETTER FROM R. D. WILLIAMS TO R. F. HIBBS." (U), APRIL 20, DRAWER 17, M-750
(9201-4 AND 5 COVERED BY AUDIT)

(94)

SYKES, J. B., "ALPHA-5 STRIPPING. LETTER TO D.A. JENNINGS FROM J.B. SYKES." (U), MAY 21, DRAWER 17, M-392
(PERSONNEL PROTECTION RECOMMENDATIONS AND PLANS)

(95)

MINCHEY, J. W., "BUILDING 9201-5 STRIPPING. LETTER FROM J. W. MINCHEY TO D. A. JENNINGS." (U), MAY 28, DRAWER 17, M-781
(STRIPPING OF 9201-5 WAS BEGUN MARCH 29, 1965. (ALSO M-392))

(96)

JENNINGS, D. A., "ALPHA 5 STRIPPING. LETTER FROM D. A. JENNINGS TO J. W. EBERT." (U), JUNE 4, DRAWER 17, M-479
(STRIPPING STARTED MARCH 29, 1965. (ALSO M-392))

CORRESPONDENCE, INTERNAL

(97)

BAYS, M. C., "BOTTLING AND HANDLING COSTS RELATED TO EXCESS MERCURY LETTER FROM M. C. BAYS TO J. K. DENTON." (U), 1965, MARCH 30, DRAWER 17, M-422
 (ALSO M-393).

(98)

SMITH, D. W., "MERCURY RECOVERY MEETING, LETTER FROM D. W. SMITH TO R. D. WILLIAMS." (U), 1966, APRIL 12, DRAWER 17, M-781
 (REPORT OF EXPLORATION FOR MERCURY IN 9201-5 FAN ROCK F)

(99)

SYKES, J. B., "GSA MERCURY PALLETS, LETTER TO W. T. CROW FROM J. B. SYKES," (U), 1968, JANUARY 31, DRAWER 17, M-393
 ((ALSC M-422))

(100)

GOLDENSON, A. F., "BUILDING 9201-4 MERCURY, LETTER FROM A. F. GOLDENSON TO W. T. CROW." (C), 1968, MARCH 4, DRAWER 17, M-750
 (PROCEDURE USED IN 1967, 9201-4 MERCURY INVENTORY)

Get them

(101)

SANDERS, MERWYN, "MERCURY ANALYSIS, LETTER FROM MERWYN SANDERS TO J. D. MCLENDON." (U), 1970, AUGUST 6, DRAWER 17, M-744
 (MERCURY CONTENT ANALYSIS)

(102)

KLOBE, J. S., "MERCURY RECOVERY, LETTER FROM J. S. KLOBE TO V. B. GRITZNER." (C), 1970, DECEMBER 7, DRAWER 17, M-54
 (COST ESTIMATES)

(103)

POSTMA, H., "MERCURY CONTAMINATION, BLDG 9201-2, LETTER FROM H. POSTMA TO F. R. BRUCE." (U), 1971, JANUARY 8, DRAWER 17, M-736
 (MERCURY)

(104)

POSTMA, H., "METALLIC MERCURY VAPOR IN BLDG 9201-2, LETTER FROM H. POSTMA TO J. M. CASE." (U), 1971, JANUARY 12, DRAWER 17, M-736
 (MERCURY VAPOR, RADIATION STANDARDS)

(105)

EBERT, J. W., "MERCURY INCIDENT, LETTER FROM J. W. EBERT TO J. M. CASE." (U), 1971, FEBRUARY 11, DRAWER 17, M-736
 (MERCURY INCIDENT IN BLDG 9201-2)

(106)

JORDAN, R. G., "NUCC-NO ENVIRONMENTAL COMMITTEE MEETING." (C), 1971, APRIL, DRAWER 17, M-459

(107)

JORDAN, R. G., "REVIEW OF LIQUID WASTE MANAGEMENT PRACTICES, LETTER FROM R. G. JORDAN TO P. R. VANSTRUM." (C), 1971, APRIL 29, DRAWER 17, M-459

CORRESPONDENCE, INTERNAL

- (108) MCALISTER, R. J., "BUILDING 81-10. LETTER FROM R. J. MCALISTER TO J. R. BARKMAN." (C), 1971, JUNE 3, DRAWER 17, M-54
(MERCURY RECOVERY AMOUNTS)
- (109) POSTMA, H., "MISCELLANEOUS, LETTER FROM H. POSTMA TO E. R. WELLS," (U), 1971, SEPTEMBER 27, DRAWER 17, M-736
(MERCURY VAPOR)
- (110) CLARK, W. E., "PARTICIPATION IN ENGINEERING FOUNDATION CONFERENCE ON JAN. 9-14, 1972, LETTER FROM W. E. CLARK (ORNL) TO H. T. KITE," (U), 1971,
OCTOBER 5, DRAWER 17, M-477
(MERCURY IN THE INDUSTRIAL ENVIRONMENT)
- (111) SMITH, D. W., "MERCURY SALVAGE, LETTER FROM D. W. SMITH TO D. R. MCCAMMEN,
" (C), 1971, DECEMBER 10, DRAWER 17, M-54
(SAMPLE ANALYSIS)
- (112) WILCOX, W. J., "EXCHANGE OF DATA ON POLLUTION CONTROL, LETTER FROM WM. J.
WILCOX, JR., TO R. A. WINKEL," (C), 1971, DECEMBER 17, DRAWER 17, M-459
(TREATMENT OF WASTE EFFLUENT STREAMS)
- (113) POSTMA, H., "MERCURY PROBLEM BUILDING 9201-2, LETTER FROM H. POSTMA TO J.
M. CASE," (U), 1971, JANUARY 26, DRAWER 17, M-736
(MERCURY-IN-H2O-WATER PROBLEM)
- (114) FULKERSON, W. F., "SURVEY OF USAGE AND DISPOSAL OF MERCURY, LETTER FROM
W. FULKERSON (ORNL) TO P. R. VANSTRUM (UCC)," (U), 1972, JUNE 7, DRAWER
17, M-458
(ORNL CONDUCTED NATIONAL SURVEY. ENDORSED BY TRAIN AND RUCKELSHAUS OF
EPA.)
- (115) POSTMA, H., "MERCURY SURVEY IN BLDG 9201-2, LETTER FROM R. S. EDWARDS TO
H. POSTMA," (U), 1972, JUNE 8, DRAWER 17, M-736
(MERCURY CONCENTRATION ANALYSIS)
- (116) WILCOX, W. J., "MERCURY ANALYSES OF INSECTICIDES, HERBICIDES, AND
PESTICIDES," (U), 1972, JUNE 12, DRAWER 17, M-744
(RUST ENG. ALKYL MERCURY PRODUCTS.)
- (117) FULKERSON, W., "QUESTIONNAIRE OF SURVEY ON THE USAGE AND DISPOSAL OF
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(ESTABLISHMENT OF UCCND OFFICE OF SAFETY AND ENVIRONMENTAL PROTECTION. CHARTER. OBJECTIVES.)
- (119) JORDAN, R. G.. "MERCURY USAGE SURVEY. LETTER FROM R. G. JORDAN TO J. M. CASE ET AL." (U). 1972. JUNE 19. DRAWER 17. M-458
- (120) JORDAN, R. G.. "ANNUAL AEC ENVIRONMENTAL POLLUTION CONTROL APPRAISAL. LETTER FROM R. G. JORDAN TO J. M. CASE ET AL." (U). 1972. SEPTEMBER 13. DRAWER 17. M-458
(SCHEDULE OF SUBJECTS FOR DISCUSSION OF POLLUTION CONTROL AT THREE PLANTS.)
- (121) VANSTRUM, P. R.. "MERCURY QUESTIONNAIRE. LETTER FROM P. R. VANSTRUM TO WILLIAM FULKERSON (ORNL)." (U). 1972. SEPTEMBER 20. DRAWER 17. M-458
(USAGE AND DISPOSAL OF MERCURY SURVEY OF JULY 1972 FOR ORGDP, PADUCAH, Y12 AND ORNL (CY 1971). MERCURY LOST BY ORNL (ISOTOPES DIV.).)
- (122) CASE, J. M.. "1972 ENVIRONMENT MANAGEMENT APPRAISAL FOR ORNL, Y12, ORGDP. CRITIQUE SESSION IN JORDAN'S OFFICE." (U). 1972. SEPTEMBER 29. DRAWER 17. M-458
(HEXAVALENT CHROMIUM, EAST FCRK POPLAR CREEK. SLUDGE DISCHARGES. DISPOSAL OF WASTE GIL.)
- (123) CASE, J. M.. "UCCND ENVIRONMENTAL MONITORING AND PROTECTION. COMMITTEE MEETING MINUTES FOR OCT 27, 1972 FROM R. G. JORDAN TO J. M. CASE ET AL." (U). 1973. NOVEMBER 7. DRAWER 17. M-458
(AEC SUGGESTIONS FOR IMPROVEMENTS. CONFIDENCE LIMITS ON VALUES PUBLISHED IN ENVMTL MONITORING RPTS. AEC RESPONSE TO OAK RIDGE ON RADIOACTIVE RELEASE)
- (124) JORDAN, R. G.. "MONITORING REPORT. LETTER FROM R. G. JORDAN TO J. M. CASE ET AL." (U). 1972. DECEMBER 20. DRAWER 17. M-458
(INTENTION TO REPORT POTENTIAL PROBLEM AREAS IN ENVIRONMENTAL POLLUTION ON MONTHLY BASIS TO ALERT MANAGEMENT.)
- (125) TENCH, F. M.. "BOTTLING MERCURY NOW STORED IN BLDG 9201-4. LETTER FROM F. M. TENCH TO N. DOW." (C). 1973. FEBRUARY 28. DRAWER 17. M-346
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- (126) MOREHEAD, J. F.. "AIR MEASUREMENTS TAKEN IN BUILDING 9729-26. LETTER TO D. McMURRAY FROM J. F. MOREHEAD." (U). 1973. JULY 27. DRAWER 17. M-422

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(Y12 EMPLOYEES MERCURY BIASSAY DATA FOR PERIOD 1953 TO 1966.)
- (130) MCLEODON, J. D., "URINARY MERCURY BIASSAY DATA. LETTER FROM J. D. MCLEODON TO G. WILSON HORDE." (U). 1973. NOVEMBER 9. DRAWER 17. M-477
(MERCURY URINARY DATA - CODING SYSTEM, MEDICAL RECORDS.)
- (131) BRADSHAW, M. R., "MERCURY. MINUTES OF MEETING ON MAY 23, 1974. Y-12 AND AEC ATTENDEES." (U). 1974. MAY 23. DRAWER 17. M-477
(MERCURY STORED IN BLDG 9720-6. LEAKING FLASKS.)
- (132) BRADSHAW, M. R., "MINUTES OF MEETING ON MERCURY. MEMO TO FILE." (U). 1974. MAY 24. DRAWER 17. M-422
- (133) BRADSHAW, M. R., "MERCURY STORED IN BLDG. 9720-26. MEMO TO FILE (UCC). FROM M. R. BRADSHAW (UCC)." (U). 1974. MAY 27. DRAWER 17. M-393
(STORAGE)
- (134) SMITH, D. W., "REBOTTLING OF GSA MERCURY. LETTER TO J. B. SYKES FROM D. W. SMITH." (U). 1974. JUNE 17. DRAWER 17. M-393
- (135) EVERETT, W. S., JR., "SURVEY OF BUILDING 9720-26 FOR MERCURY VAPOR. LETTER TO J. B. SYKES FROM W. S. EVERETT, JR.." (U). 1974. JUNE 17. DRAWER 17. M-393
(AIR MEASUREMENTS FOR 9720-26)
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(MAINTENANCE ESTIMATES. COSTS.)
- (138) MUZZALL, C. E., "ALPHA-4 STRIPPING STUDY BY C. E. MUZZALL." (U). 1974. AUGUST 19. DRAWER 17. M-220
(STRIPPING COST. VALUE OF MATERIALS. USE OF ALPHA-4. ENVIRONMENTAL IMPACT STUDIES)
- (139) BRADSHAW, M. R., "INSPECTION OF MERCURY STORAGE AREA. LETTER TO E. A. PLUHAR FROM M. R. BRADSHAW." (U). 1974. AUGUST 26. DRAWER 17. M-393
- (140) SYKES, J. B., "MERCURY SHIPMENTS. LETTER TO W. R. BRADSHAW FROM J. B. SYKES." (U). 1974. SEPTEMBER 13. DRAWER 17. M-422
- (141) SYKES, J. B., "MERCURY SHIPMENTS. LETTER TO W. C. BAYS, ET AL. FROM J. B. SYKES." (U). 1974. SEPTEMBER 13. DRAWER 17. M-393
- (142) CASE, J. M., "Y-12 URINARY MERCURY BIOASSAY DATA. LETTER FROM J. M. CASE TO P. R. VANSTRUM." (U). 1974. DECEMBER 27. DRAWER 17. M-460
(23 Y-12 PEOPLE EXPOSED TO MERCURY (1959-1974) WERE EXAMINED AND FOUND TO HAVE NO SYMPTOMS OR SIGNS OF MERCURIALISM. (ALSO M-477))
- (143) (NO AUTHOR). "COMPIILATION FILE OF MERCURY-RELATED SUBJECTS AND CORRESPONDENCE." (C). 1975 - 1983. DRAWER 17. M-58
(INVENTORY ADJUSTMENT. EXCESS. MERCURY SALE. MERCURY CLEANUP OPERATION.)
- (144) DOW, N., "MERCURY IN ALPHA 4. LETTER FROM N. DOW TO E.H. JOHNSON." (U). 1975. APRIL 18. DRAWER 17. M-81
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- (145) SMITH, D. W., "BOTTLING COSTS OF MERCURY. LETTER FROM D.W. SMITH TO V.B. GRITZNER." (U). 1975. APRIL 25. DRAWER 17. M-81
(INFO REQUIRED FOR MERCURY BOTTLING ESTIMATE. 9201-4)
- (146) SPRAGUE, T.P., "CHEMICALLY CLEANING OF MERCURY BOTTLES. LETTER FROM T.P. SPRAGUE TO NEAL DOW." (U). 1975. MAY 8. DRAWER 17. M-81
(CLEANING OF MERCURY BOTTLES)
- (147) NOOK, J. C., "MERCURY REMOVAL BUILDING 9201-4. LETTER TO D.W. SMITH FROM J.C. NOOK." (U). 1975. MAY 19. DRAWER 17. M-392

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 (MERCURY BOTTLING AND BUILDING DECONTAMINATION COSTS FOR ALPHA-4 IN FY 1976)
- (149) LANDIS, STEVE D., "MERCURY SURVEY IN BASEMENT OF BLDG 9201-2, LETTER FPCM STEVE LANDIS TO RANDALL EDWARDS," (U), 1976, MARCH 22, DRAWER 17, M-736
 (MERCURY VAPOR)
- (150) WALDRP, R. P., "PROCUREMENT OF MERCURY STORAGE FLASKS, LETTER FROM R. P. WALDRP TO A. L. FISCHER," (U), 1976, APRIL 22, DRAWER 17, M-220
- (151) NAPIER, J. M., "DECENTAMINATION OF BLDG 9201-4, LETTER FROM J. M. NAPIER TO V. DOW," (U), 1976, APRIL 22, DRAWER 17, M-346
 (EXP. DEV. PLAN FOR DECONTAMINATION OF EQUIPMENT AND WASH WATERS IN 9201-4. (ALSO M-760))
- (152) EBERT, T. H., "ACTION PLAN FOR MERCURY FLASKING, LETTER FROM T. H. EBERT TO V. B. GRITZNER," (U), 1976, MAY 5, DRAWER 17, M-346
 (MERCURY FLASKING IN 9201-4. SUPERSEDES APR 9, 1976 PLAN. PHASE I AND II OPERATIONS DEFINED. (ALSO 4-422))
- (153) EBERT, T. H., "ACTION PLAN FOR MERCURY FLASKING SAFETY ANALYSIS REPORT, LETTER TO V. B. GRITZNER (UCC) FROM J. S. ANDERSON (UCC)," (U), 1976, MAY 20, DRAWER 17, M-422
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- (154) ANDERSON, J. S., "SURVEY OF MERCURY FLASKS AND CRATES, LETTER FROM J. S. ANDERSON TO R. C. WILLIAMS," (U), 1976, MAY 28, DRAWER 17, M-477
 (USED MERCURY FLASKS AND CRATES. POSSIBLE MEANS OF DISPOSAL. PHASE III STRIPPING OPERATION. YS-2842 EQUIPMENT SPEC. (ALSO M-346, -750))
- (155) ANDERSON, J. S., "ACTION PLAN FOR MERCURY FLASKING SAFETY ANALYSIS REPORT, LETTER FROM J. S. ANDERSON TO V. B. GRITZNER," (U), 1976, JUNE 2, DRAWER 17, M-393
 (REMOVAL OF MERCURY FROM PROCESS EQUIPMENT IN ALPHA-4. (ALSO 4-422))
- (156) BAYS, M. C., "UCC & DOE MEETINGS ON REMOVAL OF MERCURY FROM ALPHA-4," (U), 1976, JUNE 5, DRAWER 17, M-391
 (STORAGE OF GSA & ERCA OWNED MERCURY)
- (157) BAYS, M. C., "UCC/DOE MEETING ON REMOVAL OF MERCURY FROM ALPHA-4," (U), 1976, JUNE 15, DRAWER 17, M-391

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- (158) MORROW, R. W., "MERCURY CONTENT OF FISH SAMPLES, LETTER FROM R. W. MORROW TO J. W. ELWOOD," (U), 1976, AUGUST 11, DRAWER 17, M-737
(ANALYSIS OF FISH FROM POPLAR CREEK)
- (159) NAPIER, J. M., "DECONTAMINATION OF BUILDING 9201-4, REV. 1 (PRELIMINARY DRAFT) LETTER FROM J. N. NAPIER TO N. DOW," (U), 1976, AUGUST 15, DRAWER 17, M-346
(COLUMN WASH TEST. (ALSC M-760))
- (160) MORROW, R. W., "MERCURY CONTENT OF FISH SAMPLES, LETTER FROM R. W. MORROW TO J. W. ELWOOD," (U), 1976, AUGUST 24, DRAWER 17, M-737
(ANALYSIS OF FISH FROM POPLAR CREEK AND MELTON HILL)
- (161) MORROW, R. W., "MERCURY CONTENT OF FISH SAMPLES, LETTER FROM R. W. MORROW TO J. W. ELWOOD," (U), 1976, SEPTEMBER 16, DRAWER 17, M-737
(ANALYSIS OF FISH FROM CLINCH RIVER)
- (162) HOOD, W. B., "SALE OF SCRAP MERCURY FLASKS, LETTER TO D. R. MCCAMMON FROM W. B. HOOD," (U), 1976, SEPTEMBER 22, DRAWER 17, M-393
- (163) McMURRAY, D., "SALE OF SCRAP MERCURY FLASK, LETTER TO D. R. BRADSHAW (K-25), FROM DON MC MURRAY (Y-12)," (U), 1976, OCTOBER 25, DRAWER 17, M-393
- (164) MORROW, R. W., "MERCURY CONTENT OF FISH SAMPLES, LETTER FROM R. W. MORROW TO J. W. ELWOOD," (U), 1976, NOVEMBER 8, DRAWER 17, M-737
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- (165) ANDERSON, J., "ERDA STAFF COMMITTEE ON-SITE PREOPERATIONAL TOUR OF MERCURY FLASKING OPERATIONS, JAN. 5, 1976," (U), 1977, JANUARY 6, DRAWER 17, M-346
(ERDA AUTHORIZATION RECEIVED ON FLASKING. (NOTE TO FILE JAN 6, 1977 BY ANDERSON.))
- (166) SPARKS, M. I., "REVIEW OF MERCURY FLASKING, LETTER FROM M. I. SPARKS TO D. J. BOSTOCK," (U), 1977, JANUARY 31, DRAWER 17, M-346
(PROCEDURES AND CONTROLS FELT TO BE ADEQUATE TO MEET SPECIFICATIONS)
- (167) NAPIER, J. M., "DECONTAMINATION OF BUILDING 9201-4, REV. 2, LETTER FROM J. M. NAPIER TO N. DOW," (U), 1977, MARCH 3, DRAWER 17, M-346
(TEST PLAN DEVELOPMENT)
- (168) AUERBACH, S. I., "BUSINESS CONFIDENTIAL REPORT ON MERCURY CONTAMINATION IN THE POPLAR CREEK - CLINCH RIVER DRAINAGE, LETTER FROM S. I. AUERBACH TO C. R. RICHMOND," (U), 1977, MARCH 22, DRAWER 17, M-843

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NAPIER, J. M., "REMOVAL OF MERCURY FROM WASTE WATERS BEFORE DUMPING TO CREEK. LETTER FROM J. M. NAPIER TO NEAL DOW." (U), 1977, JULY 11, DRAWER 17, M-346
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AUERBACH, S. I., "MONITORING DATA AND REPORTS FOR OAK RIDGE - ERDA FACILITIES. LETTER FROM S. I. AUERBACH TO C. R. RICHMOND." (U), 1977, SEPTEMBER 9, DRAWER 17, M-843

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EBERT, T. H., "MERCURY FLASKING. LETTER FROM T. H. EBERT TO W. C. HOPPE," (C), 1977, OCTOBER 3, DRAWER 17, M-220
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H. REYNOLDS, "SALE OF SCRAP MERCURY FLASKS. LETTER FROM H. REYNOLDS TO D. R. McCAMMON." (U), 1978, JULY 17, DRAWER 17, M-220
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(NO AUTHOR), "ALPHA-4 MERCURY FLASKING." (C), 1978, JULY 17, DRAWER 17, M-220
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EBERT, T. H., "ALPHA-4 MERCURY FLASKING. LETTER FROM T. H. EBERT TO M. R. BRADSHAW." (C), 1978, JULY 18, DRAWER 17, M-220
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BRADSHAW, M. R., "MERCURY INVENTORY ADJUSTMENT. LETTER FROM M. R. BRADSHAW TO W. T. CARTER." (U), 1978, SEPTEMBER 22, DRAWER 17, M-220
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SYKES, J. B., "EXCESS MERCURY (7,000 FLASKS) FOR GSA STOCKPILE STORAGE. LETTER FROM J. B. SYKES TO H. F. SMITH." (U), 1979, MARCH 9, DRAWER 17, M-393

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COX, J. K., "REQUEST FOR CERTIFIED PURITY ANALYSIS - 45,000 FLASKS OF MERCURY. LETTER TO N. DOW FROM J. K. COX." (U), 1980, FEBRUARY 7, DRAWER 17, M-393
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(NO AUTHOR). "ALPHA-4 MERCURY FLASKING." (C), 1978, JULY 17, DRAWER 17, M-220
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BRADSHAW, W. R., "MERCURY INVENTORY ADJUSTMENT. LETTER FROM W. R. BRADSHAW TO W. T. CARTER." (U), 1978, SEPTEMBER 22, DRAWER 17, M-220
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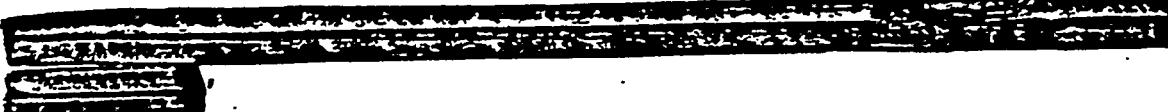
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CHARLES, J. W., "ANALYSIS OF MERCURY, LETTER TO N. DOX (UCC) FROM J. W. CHARLES (UCC)," (U), 1980, FEBRUARY 15, DRAWER 17, M-422

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NAPIER, J. M., "ADDITIONAL DATA ON CORE SAMPLES FROM NEW HOPE PGND, LETTER FROM J. M. NAPIER TO W. VANWINKLE," (U), 1982, AUGUST 18, DRAWER 17, M-744
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STIFF, A. C., "A POPLAR CREEK FISH ANALYSIS PROGRAM FOR THE DETERMINATION OF METHYLMERCURY, POLYCHLORINATED BI-PHENYLS (PCBS), AND URANIUM, LETTER FROM A. C. STIFF TO M. E. MITCHELL," K/TL/AT-174, (U), 1982, OCTOBER 9, DRAWER 17, M-787

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AUERBACH, S. I., "LITERATURE SURVEY OF POPULATION DENSITY DATA FOR SELECTED SPECIES OF SPORT FISH, LETTER FROM S. AUERBACH TO LYNN PEACOCK," (U), NOVEMBER 11, DRAWER 17, M-744
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DORSEY, J. G., "ANALYSIS OF COW TISSUE FOR TOTAL MERCURY, LETTER FROM J. G. DORSEY TO J. C. WHITE," (U), 1983, JANUARY, DRAWER 17, M-744
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MCELHANEY, R. J., "ANALYSIS OF TISSUE FROM CONTROL ANIMALS, LETTER FROM R. J. MCELHANEY TO J. C. WHITE," (U), 1983, JANUARY, DRAWER 17, M-744
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MCMURRAY, D., "GSA MERCURY STORAGE BILLING, LETTER TO W. T. CARTER FROM D. MCMURRAY," (U), 1983, JANUARY, DRAWER 17, M-393

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WILLIAMS, R. F., "1983 Y-12 MERCURY CLEANUP, MEMO FROM R. F. WILLIAMS TO W. C. HOPPE," (U), 1983, FEBRUARY 28, DRAWER 17, M-223
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YAGGI, W. J., "MERCURY CLEANUP, LETTER FROM W. J. YAGGI TO G. L. BEAN ET AL.," (U), 1983, MARCH 4, DRAWER 17, M-393
(MEETING SUMMARY OF ALPHA-5 CLEANUP)

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- (200) MILLS, J. M., "STRIPPING OF BLDG 9201-4/CLEANUP ACTIVITIES. LETTER FROM J. M. MILLS TO J. C. WHITE," (C), 1983, APRIL 27, DRAWER 17, M-437
(RECLASSIFICATION PROBLEMS)
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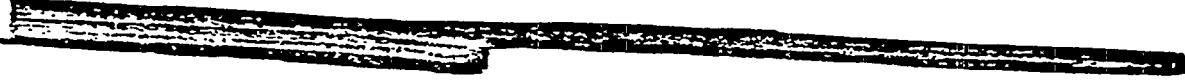
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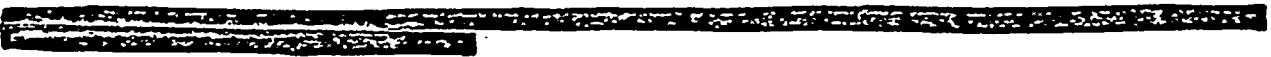
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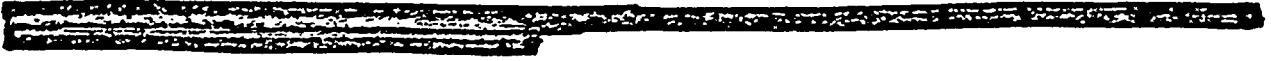
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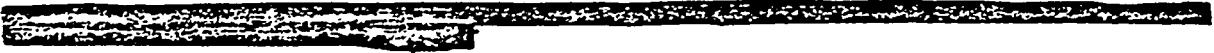
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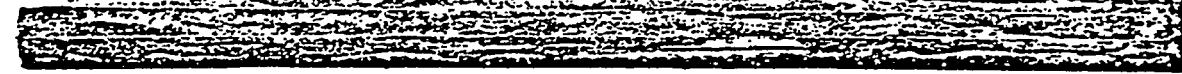
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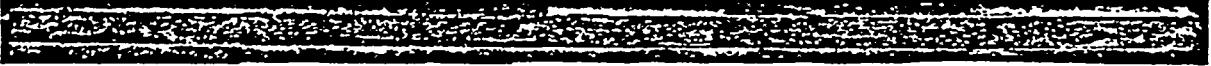
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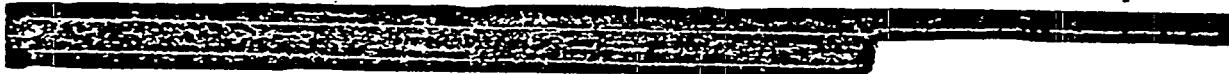
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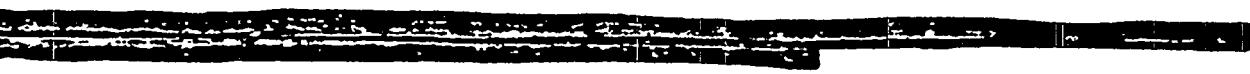
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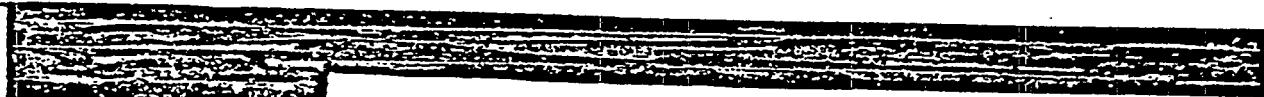


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(PROCEDURES)

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- (48) (NO AUTHOR). "ALPHA 5 EQUIPMENT AND MATERIAL ITEM LISTING." (U). 1966. JANUARY. DRAWER 5. M-472
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(ASSIGNMENTS TO COMMITTEE.)
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- (4) (NO AUTHOR). "SOLVENT INVENTORY STATUS REPORTS," (C). 1955 - 1964. DRAWER
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- (8) (NO AUTHOR). "ALLOY AND SOLVENT LOSS STUDIES," (C). 1957 - 1959. DRAWER 7,
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(COMPIILATION OF RECEIPTS SHOWING PALLET AND FLASK NUMBERS)
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- (43) (NO AUTHOR). "MONTHLY MERCURY STORAGE PALLET INVENTORY REPORT FROM 1965 - 1967." (U). 1965 - 1967. DRAWER 7, M-425
- (44) (NO AUTHOR). "PROCEDURE FOR THE FINANCIAL CONTROL OF 9221-5 STRIPPING FROM 1965 - 1967." (U). 1965 - 1967. DRAWER 7, M-427
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- (48) SMITH, D. W.. "MERCURY PACKAGING PROCEDURE. D. W. SMITH TO R. D. WILLIAMS." (U). JANLARY 18. DRAWER 7. 4-41
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- (49) SMITH, D. W.. "MERCURY BOTTLING AND ACCOUNTABILITY PROCEDURE ARC MELTING DEPARTMENT." (U). APRIL. DRAWER 8. M-41
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- (50) (NO AUTHOR). "PICKLING AND PAINTING COSTS - MERCURY FLASKS." (U). 1965 - 1966. DRAWER 8. M-416
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- (51) (NO AUTHOR). "RETURN OF LEAKING FLASKS." (U). 1965 - 1972. DRAWER 7. M-293
(COMPILEDATION OF TRANSFER RECEIPTS)

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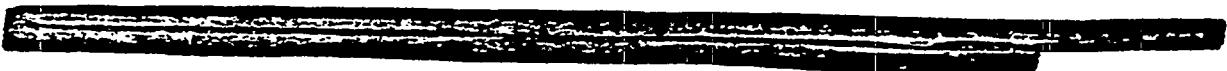
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SMITH, D. W.. "LOGBOOK OF MERCURY RECOVERED FROM BLDG. 8119." (U). 1971. DRAWER 7. M-55

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(SAMPLE ANALYSIS)

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- (78) (NO AUTHOR). "SALE UCC-ND-2685 TO MALLORY BATTERY COMPANY." (U), 1972 - 1973, DRAWER 7, M-430
 (INVITATION TO BID AND SHIPPING ORDERS)
- (79) (NO AUTHOR). "MERCURY SHIPPING ORDERS FROM Y-12 TO OTHER ORGANIZATIONS FOR 1973." (U), 1973, DRAWER 7, M-327
- (80) (NO AUTHOR). "MERCURY INTERNAL Y12 SHIPMENT TRANSMITTALS FROM 1973-1975." (U), 1973 - 1975, DRAWER 6, M-326
- (81) (NO AUTHOR). "9201-1 ESTIMATE TO FABRICATE CONTAINERS." (U), 1973, FEBRUARY 22, DRAWER 8, M-41
- (82) (NO AUTHOR). "STRIPPING. 9201-4." (C), 1973, FEBRUARY 26, DRAWER 7, M-54
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 (AEC ACCESS. (ALSO M-384, -477))
- (84) (NO AUTHOR). "MERCURY INTERNAL Y12 SHIPMENT RECEIPTS FOR 1974." (U), 1974, DRAWER 6, M-328
- (85) HICKMAN, H. D., "MERCURY PURCHASES AND SALES. LETTER FROM H. D. HICKMAN TO D. K. GESTON." (C), 1974, JUNE 29, DRAWER 7, M-54
 (HISTORY OF OAK RIDGE MERCURY ACTIVITIES)
- (86) (NO AUTHOR). "MERCURY STORAGE, HANDLING AND RELATED SERVICES. LETTER FROM J. M. CASE TO H. D. HICKMAN." (C), 1974, JULY 15, DRAWER 7, M-54
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(MERCURY STORAGE)
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- (92) (NO AUTHOR). "MAINTENANCE WORK REQUEST." (U). 1976. DRAWER 6. M-345
- (93) EBERT, T. H. ET AL.. "OPERATING INSTRUCTIONS - MERCURY FLASKING SAFETY ANALYSIS REPORT ON MERCURY FLASKING." (C). 1976 - 1978. DRAWER 8. M-225
- (94) (NO AUTHOR). "EQUIPMENT SPECIFICATION: MERCURY STORAGE FLASKS." YS-2942. (U). 1976. APRIL 19. DRAWER 7. M-325
- (95) TYL. E.. "STATUS OF MERCURY INVENTORY." (C). 1976. SEPT. 30-1977. SEPT. 30. DRAWER 7. M-918
(HANDWRITTEN SUMMARY VERIFIED BY TYL)
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Y-12



Mercury at the Y-12 Plant

A Summary of the 1983 UCC-ND Task Force Study

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Y/EX-23

Mercury at the Y-12 Plant

A Summary of the 1983 UCC-ND Task Force Study

November 1983

Oak Ridge Y-12 Plant
P.O. Box Y, Oak Ridge, TN 37831

Operated by Union Carbide Corporation
for the
U.S. Department of Energy
under Contract No. W-7405-eng-26

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Foreword

This document summarizes the work done this past summer by the UCC-ND Task Force asked to study the use of mercury in the lithium isotope separation work at the Oak Ridge Y-12 Plant from 1950 to 1963. Aspects of special interest to the task force in their study were worker health, the environment, accountability, and losses. Gordon Fee, Y-12 Plant Manager, appointed the task force on May 20, 1983.

Some of the work of the task force was completed before the congressional hearing of July 11, 1983, and was summarized in the testimony of Chester R. Richmond, an Associate Director of the Oak Ridge National Laboratory. That testimony is included as Appendix A of this report. Writing of the formal report of the task force was not completed until August, and it includes considerable process details and documentation that are classified Secret.

A version of the report with that classified information deleted is now being prepared for release.

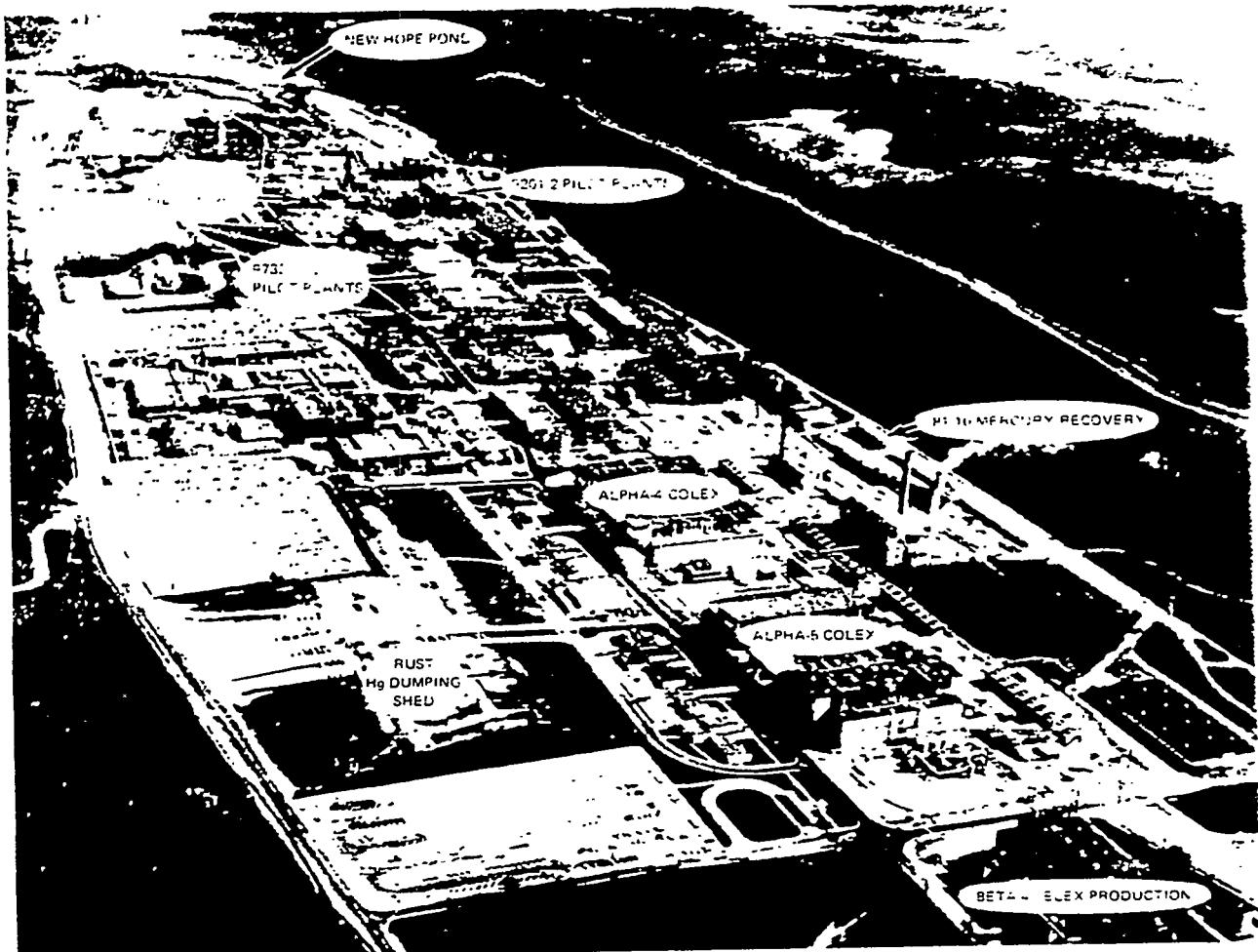
Even the unclassified version with deletions, however, is quite detailed, and those persons interested in the study may find its 417 pages ponderous. This report, written primarily for Y-12 employees, is intended to fill the need for a summary of the more important findings of the task force in a form both more accessible and more usable than the detailed version. Moreover, since the August report, some important information has developed that is of much interest but that has not yet been prepared for formal technical reporting. That new information is presented here. This report was prepared by editing and expanding the executive summary of the August report, adding several key illustrations and data summaries, and updating the work on the sampling and analyses of sediments in the Watts Bar and Chickamauga lakes. ■

William J. Wilcox, Jr.

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Looking east, the Oak Ridge Y-12 Plant in about 1963 at the time of completion of the Lithium isotope Separation Program [code name, Alloy Development Program (ADP)]. The primary production buildings were Alpha-4 and Alpha-5 (Buildings 9201-4 and 9201-5), which used the Colex process (column exchange). The mercury-receiving operation was carried out in an open-air shed (see lower left of photograph) operated by Rust Engineering for the U.S. Atomic Energy Commission on the site of the current Building 9103.

History

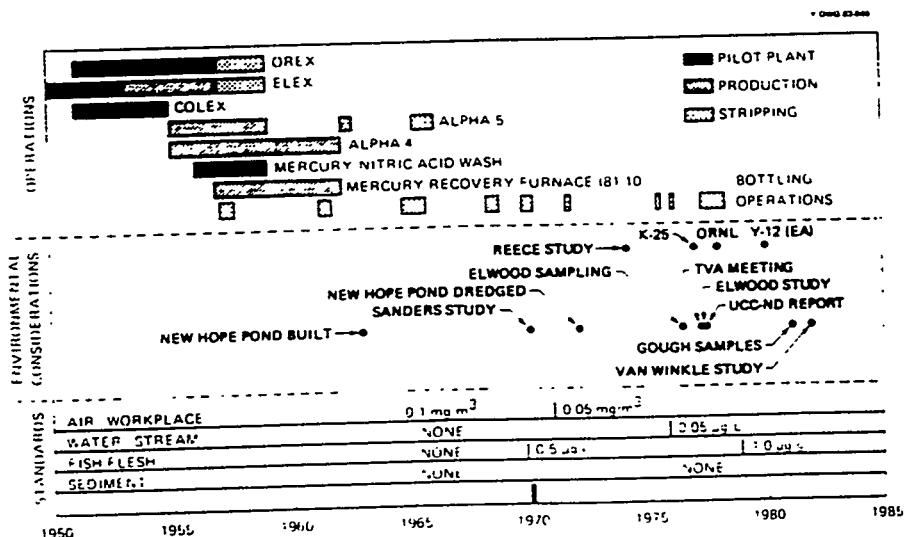
The large-scale use of mercury at the Y-12 Plant was associated with the production of lithium enriched in the light isotope form, lithium-6, for use in hydrogen or thermonuclear weapons. The heavier lithium-7 isotope form is more abundant in nature. The initial request to Y-12 to develop processes for lithium isotope separation came in 1950, and a major production plant expansion was undertaken in 1953. In the remarkably short period of 15 months, two large production facilities were designed and built, and the first units were put into production in January 1955. Production stopped in 1963.

The process that made this effort a success is called Colex, the name being a contraction of "column exchange." It is a chemical exchange process in which lithium isotopes are partially separated as they transfer between two chemical phases. One of these phases is an aqueous solution of lithium hydroxide, and the other phase is a lithium amalgam, a solution of lithium in mercury. Many millions of pounds of mercury were essential to the project. Directives signed by President Eisenhower made the mercury available from the national stockpile. It is this mercury used for the Colex process from 1955 to 1963 that is the source of today's concerns.

When the need was recognized for large-scale separation of the lithium isotopes, no process was

available to accomplish that separation. Figure 1 gives a chronological summary of the progress made and processes used since 1950. The first successful laboratory separation was achieved using the Elex process—an electrically driven chemical exchange process akin to a process used in industry (in chlor-alkali production facilities) for making chlorine and sodium hydroxide. A production-scale plant was operated in Building 9204-4. A view of some of the equipment used in this process is given in Figure 2. By contrast, the Orex process, in which an organic solution of lithium was exchanged with lithium amalgam, never got beyond the pilot-plant scale. Research and development on the Colex process began in 1951 and proved very successful, resulting in the shutting down and dismantling of work on the Orex and Elex processes. Figure 3 shows the facilities in which lithium isotope separation work was done. Meeting of production targets permitted shutdown of Building 9201-5 in 1959 and of Building 9201-4 in 1962. The 9201-5 plant was started up again for a six-month campaign in 1963, and then all production ceased. The Colex equipment for 9201-5 was dismantled and disposed of during 1965 and 1966, but the Colex equipment in 9201-4 remains. Plans are to remove that equipment within the next few years. ■

Figure 1. Chronology of lithium isotope separation operations at the Y-12 Plant and related information.



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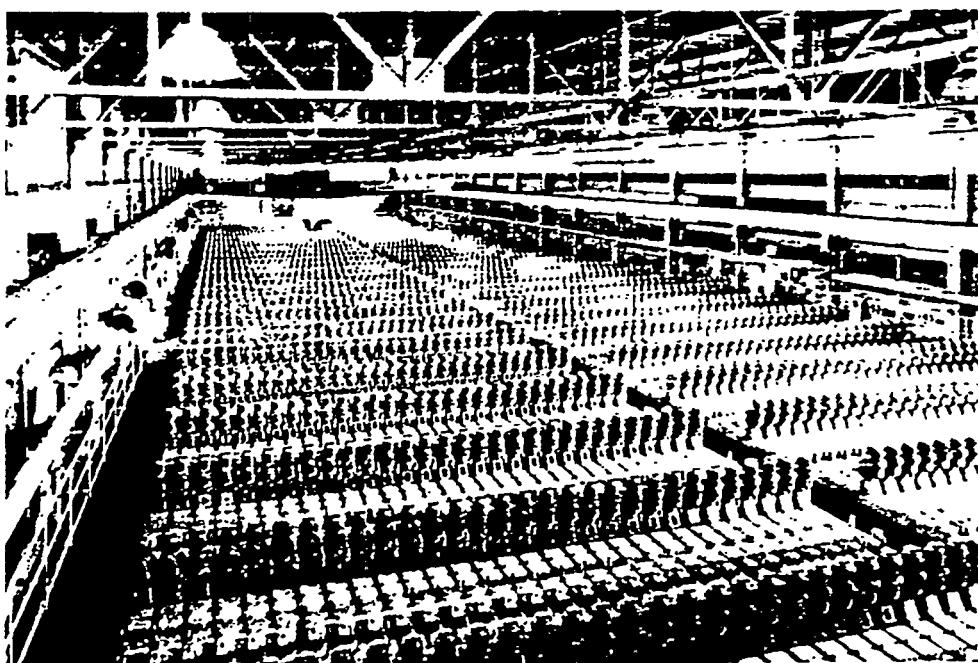


Figure 2. Partial view of an Elex (electrical exchange) cascade in 1955.

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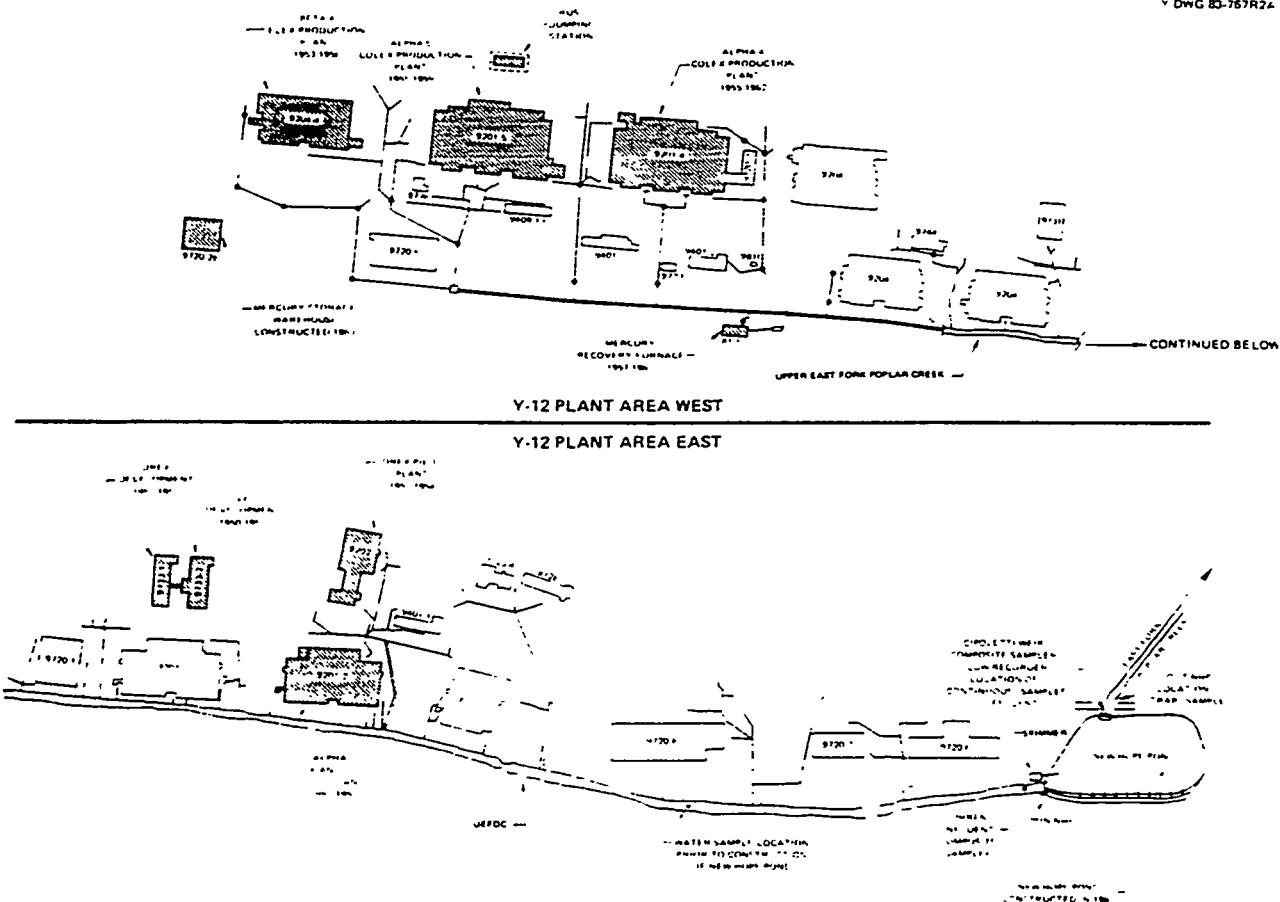


Figure 3. Lithium isotope separation facilities at the Y-12 Plant, 1950-1963.

Colex Process

The process is based on the fact that the lithium-6 isotope becomes concentrated to a slightly greater extent in the mercury phase than does the lithium-7 isotope. If a solution of lithium hydroxide in water is made to contact a solution of lithium metal in mercury, an exchange of the lithium will occur such that the lithium-6 concentration in the amalgam will be a little higher than in the aqueous phase. This process is repeated many times so that useful degrees of enrichment are achieved as well as significant quantities of products. The tails (high lithium-7) reflux stream is shown on the left of Figure 4. In this process step, lithium from the column aqueous waste stream is plated into clean mercury to form lithium amalgam, which is then pumped to the column cascade. Some is withdrawn and stored as the process "waste."

On the other end of the cascade, shown to the right in Figure 4, the product-enriched lithium-6 is withdrawn during the product reflux step. This step involves decomposing the lithium amalgam coming from the "top" of the cascade (i.e., the bottom of the last column). Decomposition is effected by contacting the amalgam with water, resulting in a solution of lithium hydroxide in water and mercury. Some of the product solution is refluxed back to the cascade.

Some of the auxiliary process equipment used to purify the mercury for the Colex process is shown in Figure 5. The amalgam formation area (code name, Absorber Room) of one of the Colex cascades is shown in Figure 6. In these long cells (arranged perpendicular to the direction the camera is facing), lithium is forced into mercury by an electric current to form lithium amalgam. ■

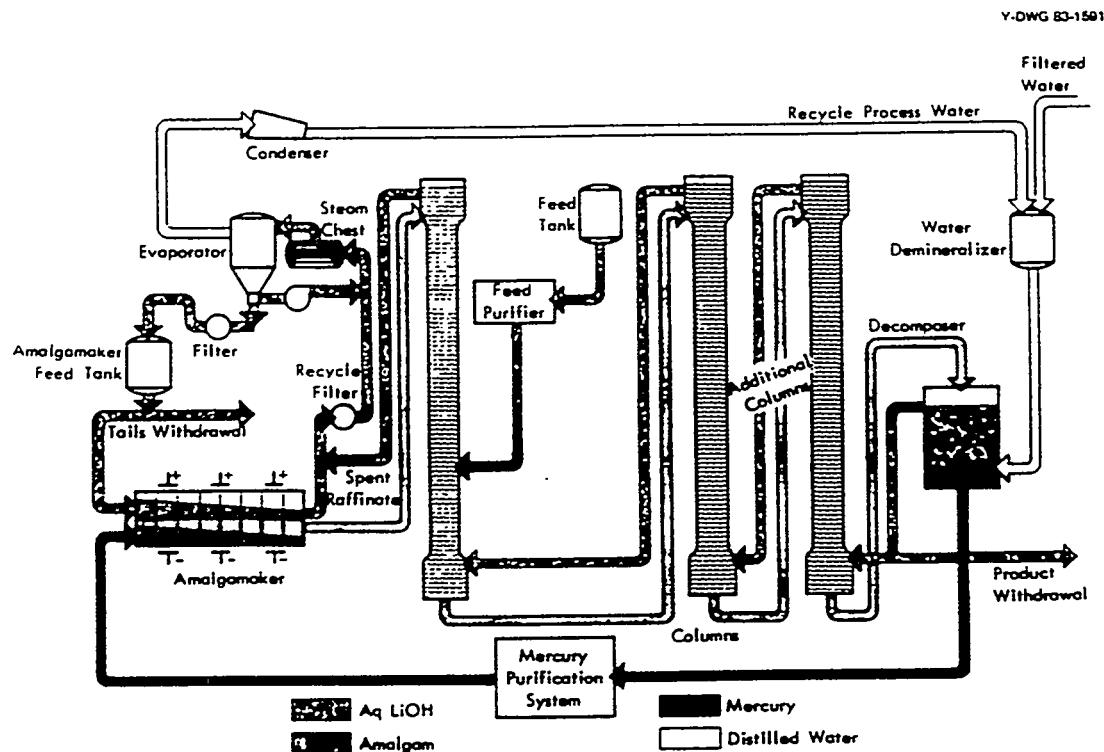


Figure 4. The Colex process for lithium isotope separation.

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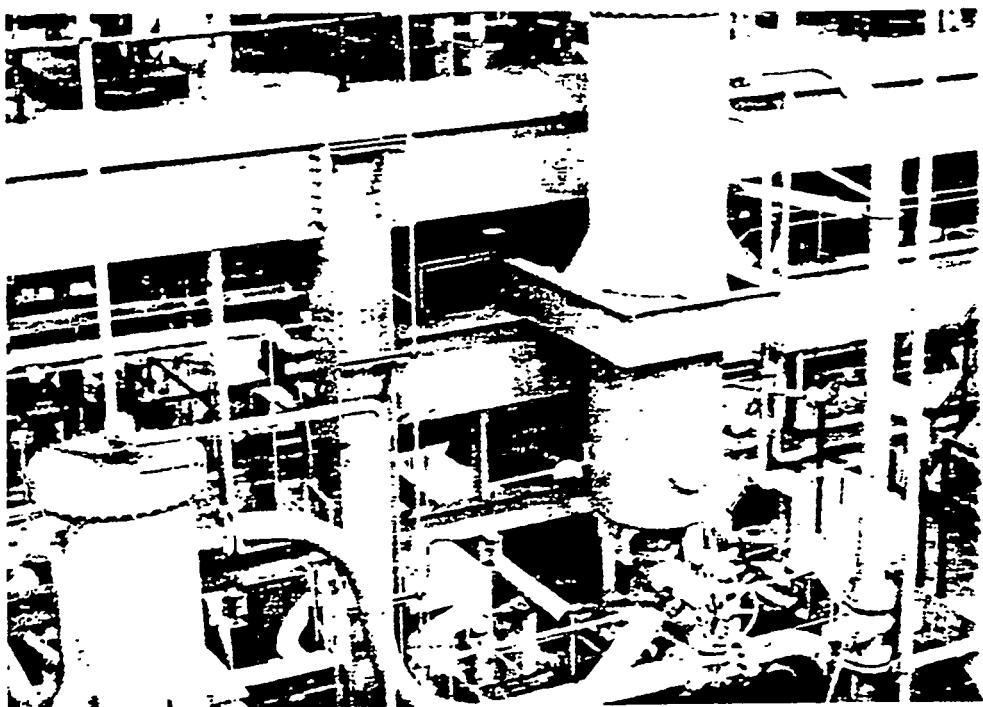


Figure 5. A mercury-nitric acid purification system used in the early years of Colex operations to remove impurities from the mercury. It was the source of most of the mercury lost to the creek.

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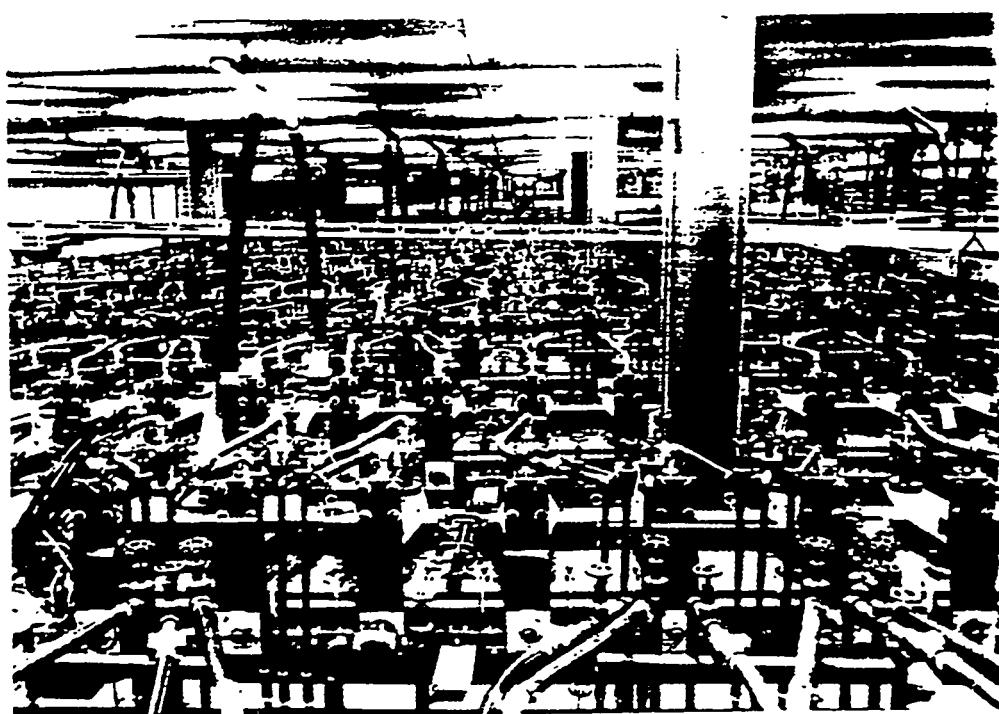


Figure 6. The amalgam formation area for a Colex cascade.

Worker Health

Industrial hygiene. Mercury toxicity was a major concern of the U.S. Atomic Energy Commission (AEC) and Y-12 Plant managers and industrial hygienists as they prepared in 1953 and 1954 for Colex operations. (In the chronology of mercury standards given in Table 1, note the upper limits in effect at the Y-12 Plant in 1952.) The process was to involve thousands of workers, and programs to cope with the recognized hazards of breathing mercury vapor were instituted before the cascades went into operation. Industrial hygiene programs were already in operation because of the need to protect worker health in the laboratory, in the pilot plant, and in production programs under way in 1950-1954 on Orex and Elex as well as on Colex. But the scale of operations was to be expanded greatly and much larger quantities of mercury were to be involved in Colex than in any of the previous operations.

The floors of the Colex buildings were modified so that floor drains emptied into special tanks in the basement. These tanks were designed so that mercury could be recovered before wastewater (e.g., mop water) was released to other water-collecting sumps located inside and outside the buildings before entering the creek. These precautions were taken because it was recognized that Y-12 was pioneering an entirely new process using pumps and other equipment

that had never before been used for such applications. The engineers anticipated frequent maintenance and operational problems during the start-up of the new processes. The first year of production, 1955, was indeed a troublesome one. Many problems developed with the equipment. Pumps and valves needed to be serviced often, the process equipment was full of mercury, and spillage or leakage of mercury during normal maintenance operations was expected and encountered. The spills and leaks were accommodated by special containers and procedures.

The mercury concentration in the workplace air was monitored frequently. (In 1956 alone 280,000 air readings were taken.) Figures 7 and 8 provide air sampling data collected in Buildings 9201-4 and 9201-5, respectively, between 1955 and 1961. Figure 9 shows a collection of air sampling data taken at the Y-12 Plant between 1956 and 1971. During cascade start-up in 1955, many mercury concentration readings of the workplace air were higher than the then recommended standard of 0.1 mg/m^3 (0.05 mg/m^3 now).

A urinalysis program started in 1953 provided an additional check on worker exposures to mercury. During the time that elevated concentrations of mercury in air were encountered in 1955, the urinalysis data also showed elevated readings (see Figure 10), although the average for all workers in the urinalysis program never exceeded the

Table 1. Recommended guidelines for mercury concentrations, 1943-1973

Year	Organization	Guideline or standard	
		Air (mg/m ³)	Urine (mg/L)
1943	American National Standards Institute	0.1	
1946	American Conference of Government Industrial Hygienists	0.1	
1952	Y-12 Plant	0.1	0.3
1957	University of Rochester recommendations	0.1	0.3
1971	American National Standards Institute	0.1	
1971	American Conference of Government Industrial Hygienists	0.05	
1972	American National Standards Institute	0.05	
1973	National Institute for Occupational Safety and Health	0.05	
1973	Y-12 Plant	0.05	0.3

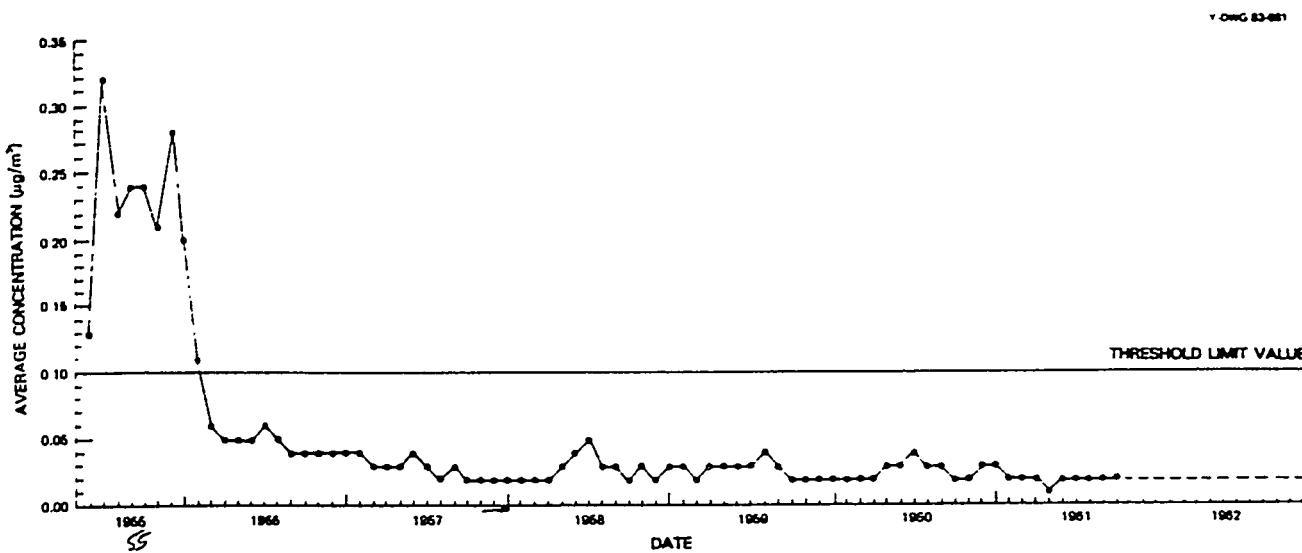


Figure 7. Mercury concentration in Building 9201-4 workplace air (average of air samples by month).

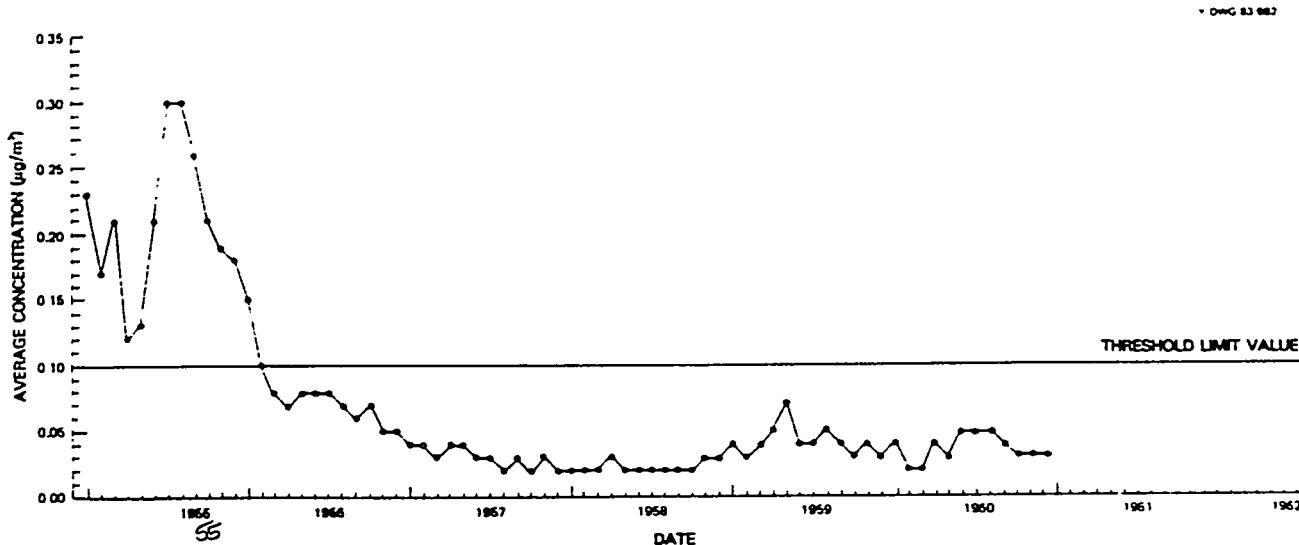


Figure 8. Mercury concentration in Building 9201-5 workplace air (average of air samples by month).

recommended maximum urinalysis mercury value (then and now) of 0.3 mg/L (Figure 11). Still, approximately 200 to 300 workers had readings that did exceed the 0.3-mg/L level during the latter part of 1955 and the early part of 1956. Figure 12 shows the number of people whose urinalysis mercury value exceeded the standard during the period 1953-1971. When a worker's urinary mercury or albumin values remained at a high level for several specimens, the individual involved was reassigned to another work area

until the urinalysis mercury or albumin values dropped to the normal level; the employee then returned to work in the mercury area. Approximately 70 people were involved in temporary reassignments of this nature. The amount of time necessary to clear mercury from the body is indicated by the data given in Figure 13.

In addition to the air sampling and urinalysis programs, a special medical surveillance program provided that clinical examinations of mercury

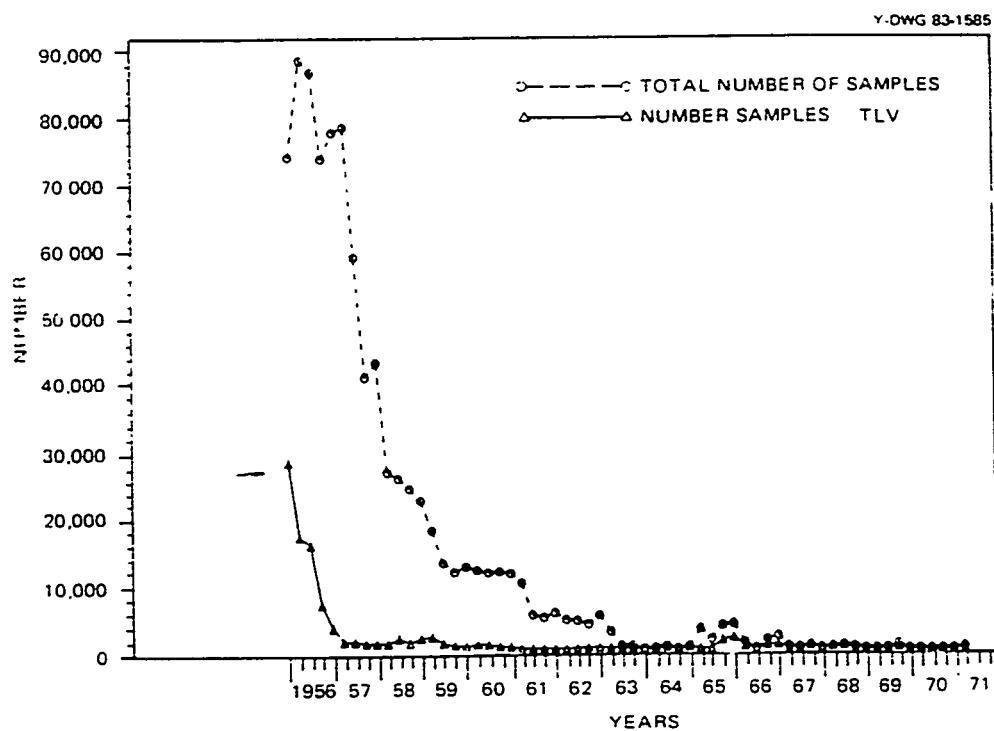


Figure 9. Routine environmental air samples for the Y-12 Plant [plot of the total number of samples taken and the number exceeding the threshold limit value (TLV) of 0.1 mg of mercury per cubic meter of air].

per '74?

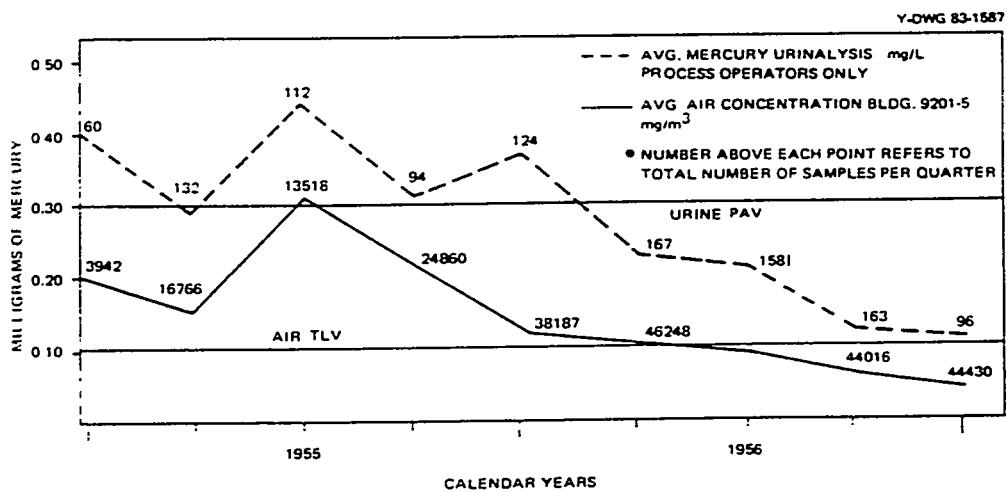


Figure 10. Y-12 data showing the correlation between mercury vapor in the workplace air and mercury in workers' urine samples. (The correlation had been observed elsewhere.) The recommended mercury levels of 0.1 mg/m³ for air and 0.3 mg/L for urine came from studies of the felt hat industry conducted in 1941 by the U.S. Public Health Service. Information gathered here supports the choice of 0.3 mg/L in urine as a useful indicator value.

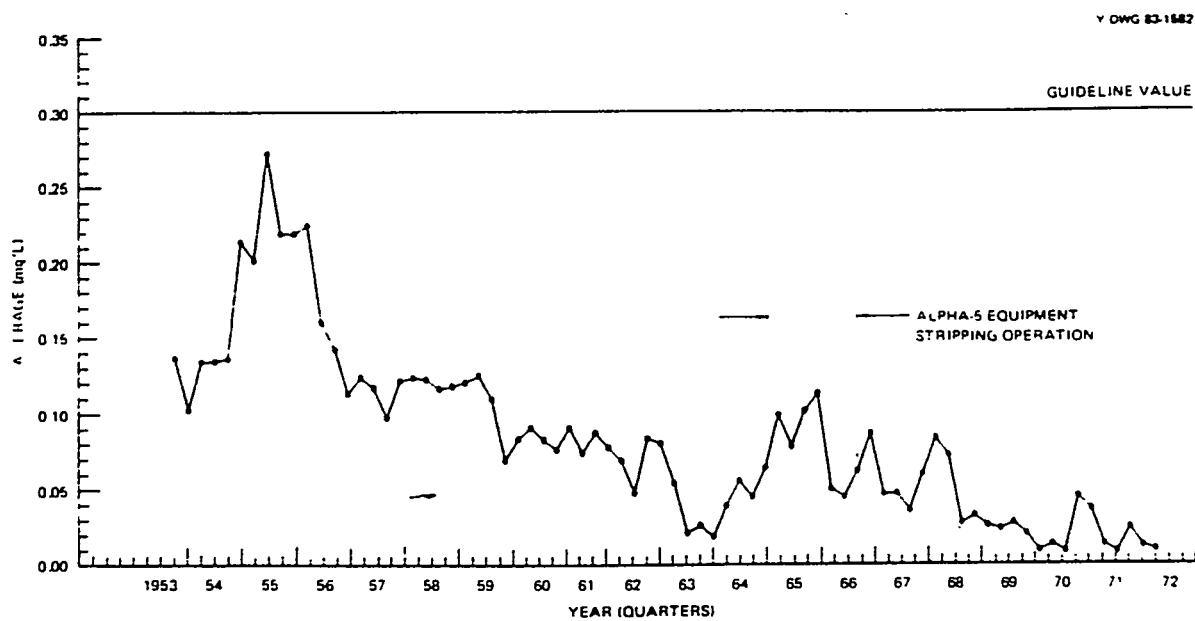


Figure 11. Averages of urinalysis results for all mercury workers per quarter.

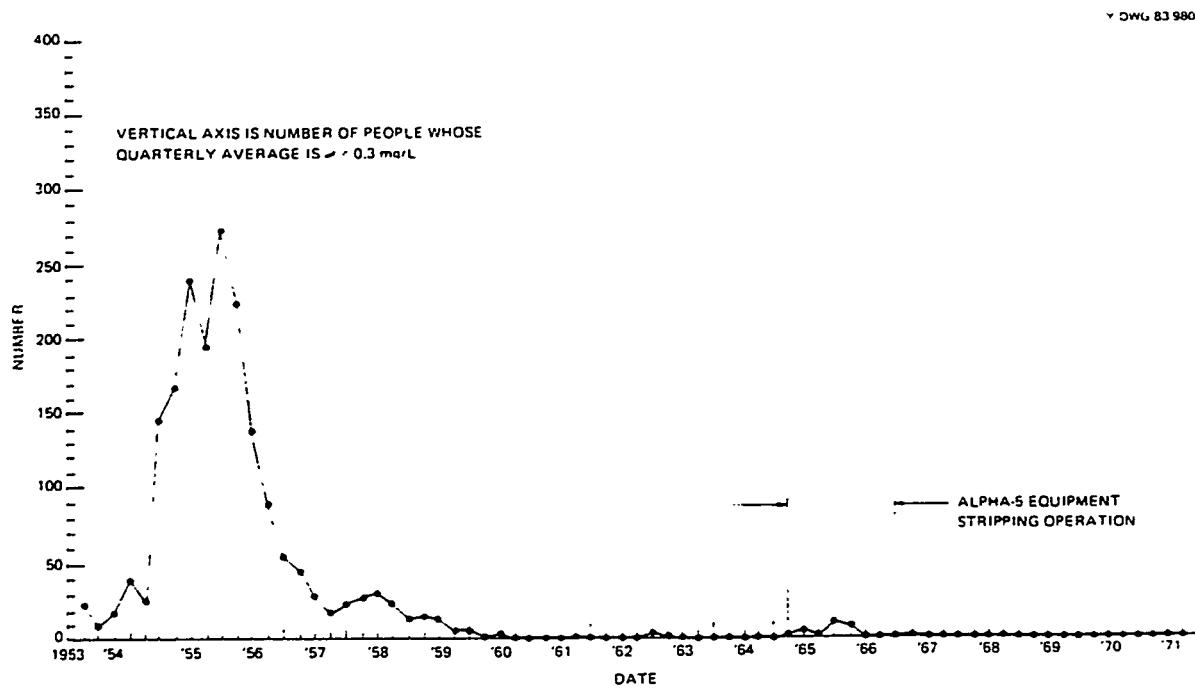


Figure 12. Number of persons whose quarterly urinalysis mercury value exceeded the recommended standard of 0.3 mg/L between 1953 and 1971.

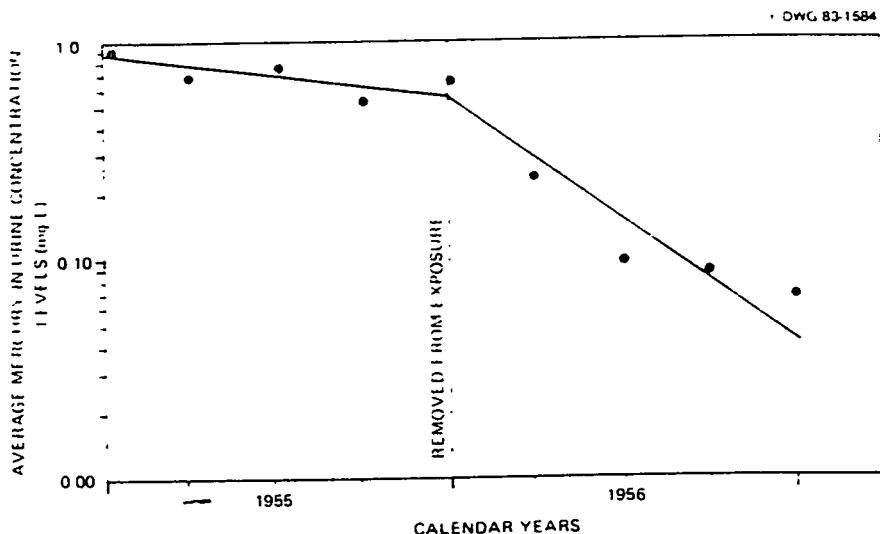


Figure 13. Data from a Y-12 Medical Department report (1957) indicating the time necessary to clear mercury from the body. The points are averages of urinalysis sample data on about 24 employees who were removed from their workplaces in January 1956 because of elevated urinalysis mercury values. They had been exposed to mercury 12 to 15 months prior to that time and showed decreasing levels during 1955. It took about 3 months for urinalysis values to reach 0.3 mg/L and about 9 months to reach 0.1 mg/L.

workers be performed every six months. Persons with a history of albuminuria, kidney problems, or hypertension were screened out and not allowed to work with mercury.

Toward the latter part of the Colex start-up during 1955, AEC and Y-12 management undertook a crash program to bring the workplace mercury vapor down to acceptable levels. The program involved various efforts such as studies of paints and technical studies of substances that could reduce vapor pressure and agents that could dissolve tiny mercury droplets. Building design changes included renovation of the ventilation systems and installation of large fans in the end walls to provide more fresh air (Figure 14). Other changes included major new housekeeping programs and the installation of a special house-vacuum system for mercury pickup. A study of commercially available respirators and cartridges resulted in the adoption in the spring of 1956 of a different (Mersorb) cartridge and renewed emphasis on the use of respirators. The effectiveness of these and other efforts is

documented in the historical record of air concentrations, which shows that levels of mercury vapor in air were dramatically reduced and under control by March 1956 and remained under control during the next seven years of operation.

1974 Medical checkup. In 1974 a consultant of the National Institute for Occupational Safety and Health, Dr. Z. Bell, reviewed the Y-12 data on mercury worker exposure. He picked out 50 of the original workers, most of whom had received high exposures (based on urinalysis), and asked the Y-12 medical staff to examine them according to a protocol that he suggested. Examination of each of the 23 employees still on the payroll revealed no symptoms of mercury poisoning. Another interest in this exercise was in looking for mercurialensis, a harmless discoloration of the eye. Only one case was observed and this in a worker not exposed to high levels of mercury.

1983 Mortality study. In 1983 Oak Ridge Associated Universities (ORAU) conducted, at the ~~death~~ lethality

Y/PH 102455



Figure 14. New exhaust system added to Building 9201-5 during 1955

request of the task force, a preliminary epidemiological study* of the mortality of the Y-12 mercury worker population by comparing this group (1477) with the other Y-12 workers (4920) and then comparing both groups with the U.S. population as a whole (Table 2). The purpose was to determine whether there is any evidence to suggest that the death rates are higher for the employees who worked in the Y-12 mercury-exposure areas than for other Y-12 employees. No such evidence was found. Death rates for mercury workers as a group were 93% of the rates for the U.S. population group to which they were compared, while the death rates for the Y-12 nonmercury workers were 90% of the rates for the U.S. population. The statistical confidence intervals for each category overlapped.

*This study is described as preliminary because only data on deaths through 1973 were available for inclusion. Plans are to update this study in the fall of 1982.

considerably, and no significant difference was found. Similarly, no difference was found between the Y-12 mercury workers and the other Y-12 workers in the death rates due to cancers, diseases of the central nervous system, respiratory diseases, or chronic nephritis.

1983 Medical checkup. As a supplement to the regular medical program, Y-12 initiated planning in August 1983 for a special checkup for Y-12 mercury workers, in addition to dealing with the concerns that some of the workers may have about their health, the checkup offers an opportunity, perhaps unique, to study a fairly large group of mercury workers 20 years after well-documented exposures (27,000 urinalyses on 2450 people). Although the studies elsewhere of people with similar degrees of exposure show no organic effects, the Y-12 group is larger and has a longer-term after exposure. The most common symptoms of chronic metallic mercury toxicity

Table 2. Standardized mortality ratios for selected causes of death in monitored and nonmonitored white male Y-12 workers^a

Causes of death	Never monitored		Monitored	
	SMR ^b	Obs ^c	SMR	Obs
All deaths	0.90 (0.81, 0.99) ^d	405	0.93 (0.79, 1.08)	164
All cancer	1.03 (0.82, 1.27)	84	0.98 (0.67, 1.37)	33
Liver cancer	1.23 (0.14, 4.43)	2	1.59 (0.02, 8.83)	1
Lung cancer	— 1.12 (0.74, 1.62)	28	1.46 (0.83, 2.37)	16
Kidney cancer	0.46 (0.01, 2.56)	1	3.27 (0.66, 9.55)	3
Brain and central nervous system cancer	2.18 (0.94, 4.30)	8	0.69 (0.01, 3.83)	1
All diseases of the nervous system sense organs	0.66 (0.13, 1.93)	3	0.00 (1.67) ^e	0
Vascular lesions of the central nervous system	0.84 (0.50, 1.31)	19	0.80 (0.32, 1.64)	7
Respiratory diseases	0.85 (0.50, 1.34)	18	0.46 (0.12, 1.19)	4
Chronic nephritis	0.64 (0.07, 2.30)	2	0.00 (1.09) ^f	0

^aU.S. white male death rates adjusted for age and calendar year were used as the standard.

^bStandardized mortality ratio.

^cObserved number of deaths.

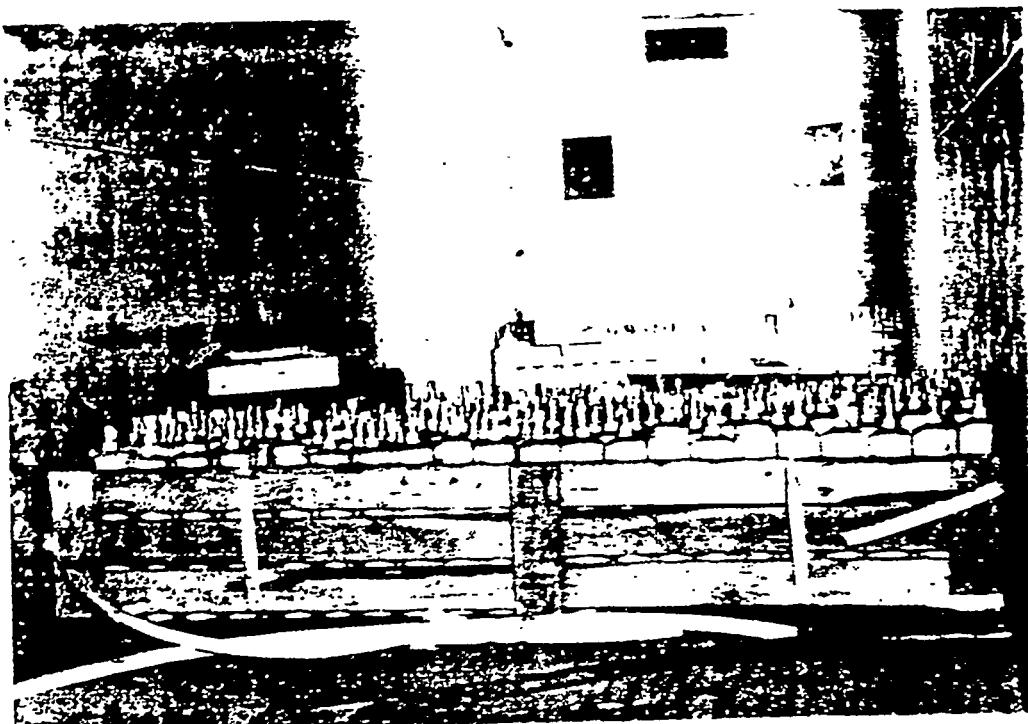
^d95% Confidence interval.

^eExpected number of deaths where observed deaths is zero.

where it has been seen are, among others, neurological (e.g., tremors) and psychological (e.g., memory loss) and gingivitis. These signs are hard to distinguish from some natural aging effects that, of course, are another feature of this group. Consequently, the first step in getting the current study started has been to locate foremost experts available in mercury toxicology and chronic mercurialism diagnosis and to get their

recommendations on what tests and procedures should be used (rather than to simply repeat what was done in the 1974 study). Eight experts are now serving as a panel to develop the protocol and study plan to be conducted by an outside medical group. It is hoped that the planning can be completed and that examinations can begin in the next few months. ■

ORO/PH-55-762-7



Mercury flasks arriving in a tractor trailer at the Rust Engineering unloading facility.

ORO/PH-55-762-4



Mercury flasks being unloaded by Rust Engineering personnel.

Mercury Material Balance

In addition to the concern for worker health, another area of interest for this task force in 1983 was to develop the best estimates possible for the amount of mercury lost or unaccounted for from the lithium cascade operations. The figure most often reported in the media in recent months has been 2.4 million lb—usually referred to as “spilled” or “lost” mercury. That number comes from the Y-12 1977 report, *Mercury Inventory at Y-12 Plant, 1950 Through 1977*. In this report, the number is correctly referred to as being the amount of mercury lost plus that not accounted for. The distinction between the amount lost and the amount not accounted for has at times been blurred, but, in fact, most of the losses are pretty well known. The amount discharged to the air or into the creek is indeed lost from our control but it can be accounted for.

The task force approach has been first to bring the 1977 data on the amount of mercury that can be accounted for up to date. Millions of pounds of mercury were removed from the

process equipment and flasked since January 1977. The other accounted-for numbers were reviewed and revised as appropriate. A major effort was expended on reviewing the best remaining records of mercury transfers into Y-12 and on restudying the receiving operation. The mercury-receiving operation was carried out by Rust Engineering for AEC, and all their records, which were transferred to the Records Depository in Atlanta, were destroyed as scheduled some years ago. Rust did not weigh the mercury as received from the General Services Administration (GSA). Some original GSA flasks are shown in Figure 15. A pipeline led underground to the Colex cascades, and accountability for the mercury became the responsibility of Y-12 at the valve in that receiving line.

Then the losses presented in the 1977 report were reevaluated based on the history of the period, interviews, and other reports. A number of losses not previously recognized were identified and added to the list. While some errors were found and some new information

? 1.9 not acc'td for
0.5 lost

ORO-55-762-2



Figure 15. Variety of original flasks received from GSA in 1955 (nominal contents, 76 lb of mercury).

turned up, the net differences between the 1977 and 1983 figures are not major ones, and they do not alter the picture drastically (Table 3). Given the time allotted for the preparation of the 1977 report, namely, two weeks, and the effort expended (two people working part-time), the accuracy of the 1977 estimate is commendable.

The 2.0 million lb lost or not accounted for is lower than the 1977 figure (2.4 million lb) not because of a change in the estimated receipts but because of net increases in several of the accounted-for categories. The great majority of the accounted-for material is that quantity of

mercury actually put into flasks and weighed, and this number is very well known. The other numbers are the best estimates that can be established from records and inspections.

The 0.7 million lb in known losses includes losses to the air, water, and land. The losses to air and land are much higher than estimated in our 1977 report (494,000 vs 87,000 lb), and the losses to the water (creek) are lower (239,000 vs 470,000 lb). The rationale for each of the new estimates was developed in detail by the task force, and it is the consensus of this task force that these are better estimates than the 1977

Table 3. Y-12 mercury material balance

	Best estimate, UCC-ND mercury task force, June 20, 1983	Best estimate, Y-12 Report, June 9, 1977
Vouchered to Y-12	a	a
Accounted for		
Returned unopened or rebottled and stored/sold	a	a
In lithium hydroxide tails, sold and stored	a	a
In Building 9201-5 scrap, sold	14,000	10,000
In Building 9201-5 sludge, sold to Mallory	174,000	111,000
As flasking overage given to GSA	a	a
In Building 9201-4 equipment, still in place	200,000	a
In sludges and sumps, Alpha-4	250,000	100,000
In Building 9201-2 sewer pipe, at ORNL	800	b
Accounted-for total	a	a
Lost or not accounted for	2,025,056	2,437,752
Lost to air	51,300	30,000
Lost to East Fork Poplar Creek	238,944	470,000
Lost to New Hope Pond sediment, Chestnut Ridge	6,629	7,200
Lost to New Hope Pond sediments now in place	8,475	b
Lost to ground, Building 9201-5 spill accident	49,853	49,853
Lost to ground, seven other spills	375,000	b
Lost to ground, Building 81-10 operations	3,000	b
Lost total	733,201	557,053
Not-accounted-for total	1,291,855 ^c	1,880,699 ^c

^aThese data are classified for security reasons.

^bData not available in 1977 report.

^cThe numbers are certainly not accurate to ± 1 lb. Such specific totals are listed for accounting purposes only.

numbers. The details of these environmental losses are discussed later in this report.

The 1.3 million lb not accounted for is then arrived at by difference. The task force identified several probable explanations of where about half this mercury (645,000 lb) may be located (see Table 4). Two of these explanations do deserve mention here; however, they are not understood well enough for the mercury to be included in the known-losses or accounted-for categories. One is an estimate of 60,000 lb, a very rough guess at what might be contained within the production building structures (walls, ceilings, floors, insulation, etc.). Since there is no analytical sampling basis for such an estimate, the approach used was to follow the pattern of an Environmental Protection Agency (EPA) study of the chlor-alkali industry, which showed substantial losses of mercury each year by this route in those kinds of plants.

Another explanation for an even larger part of the not-accounted-for mercury is the big uncertainty as to the amount of mercury actually received at Y-12. An intensive study of the available records of mercury procurement was carried out during June 1983. Persons who had worked in the Colex process were interviewed, and GSA offices in Washington, D.C., were visited to try to get information on which to base a better mercury material balance. But no hard data on the actual amounts shipped or received could be located. It has been speculated that the difference between the quantity of mercury Y-12 was charged with and the quantity actually received might have been about 500,000 lb, perhaps half of the 1.3 million lb not accounted for. One former AEC official interviewed guessed the shortage might be as high as the equivalent of 900,000 lb. Obviously, there is no way the exact figure can be determined at this time. The

Table 4. Results of 1983 task force study

	Mercury (lb)	
	June 1983	June 1977
Mercury lost, spilled, dumped to environment		
Lost to air (1950-1963)	51,000	30,000
Lost to East Fork Poplar Creek (1950-1982)	239,000	470,000
Lost to ground under Y-12	428,000	50,000
Lost to sediments in New Hope Pond	15,000	7,000
Total	733,000	560,000
Mercury not accounted for	1,300,000	1,900,000^b
Speculations^a		
Did not receive	500,000	
In building structures	60,000	
Other specific losses	85,000	

^aThese estimates cannot now be proven.

^bThe number most often reported in the news media is 2.4 million lb, and this is either referred to as mercury lost, dumped, spilled, or unaccounted for. The correct terminology is lost and not accounted for since it was a sum of these two categories in our original Y-12 report.

No. of
flasks
assumed
full
(76 lb)

figure on which our not-accounted-for number is based is the quantity charged to Y-12. the total of a number of transfer vouchers that AEC sent to Y-12 and declared to be the basis for Y-12 accountability. No actual weighing took place, either by GSA, Rust Engineering, or Y-12. GSA furnished the mercury from the government's strategic material stockpile, Rust Engineering received and dumped the mercury into the pipeline, and Y-12 filled the cascades from the pipeline. Each of the tens of thousands of flasks was assumed to contain 76.0 lb of mercury, the internationally accepted convention. But it is known from interviews with people involved in the original dumping operation that many flasks leaked, that some were only partially filled, and that some were even empty.

Even before the Colex process was shut down, Y-12 started to return some of the excess mercury to the stockpile. One of the first shipments in 1957 involved thousands of flasks that had been procured to serve as an operating reserve but had never needed to be opened. In making arrangements for this shipment, the GSA instructed the AEC to ask Y-12 to "... ship only

full units. Sort out obvious leakers or unfilled units . . ." In addition, Y-12 filled a number of requests from other customers at AEC's instructions. However, because of the large number of complaints received about leaky flasks and shortages, Y-12 finally refused to ship any more until the mercury was reflasked. This information suggests that a number of the original flasks shipped to Y-12 were not in good condition and that not all the flasks contained 76 lb of mercury. The correspondence between the AEC and the Y-12 Plant subsequent to this period reveals an increasing concern with the poor condition of the flasks, which culminated in the GSA decision to authorize AEC and Y-12 to procure new flasks and to rebottle the inventories on hand at Y-12 in these flasks. As a result, thousands of the old flasks in poor condition were sold as scrap many years ago, and the inventory now maintained at Y-12 as part of the government's stockpile is carefully warehoused and kept in excellent condition (Figure 16).

Of the 1.3 million lb of mercury officially not accounted for at this time (including 0.5 million lb for shortage in receipts), pretty good guesses can

when?

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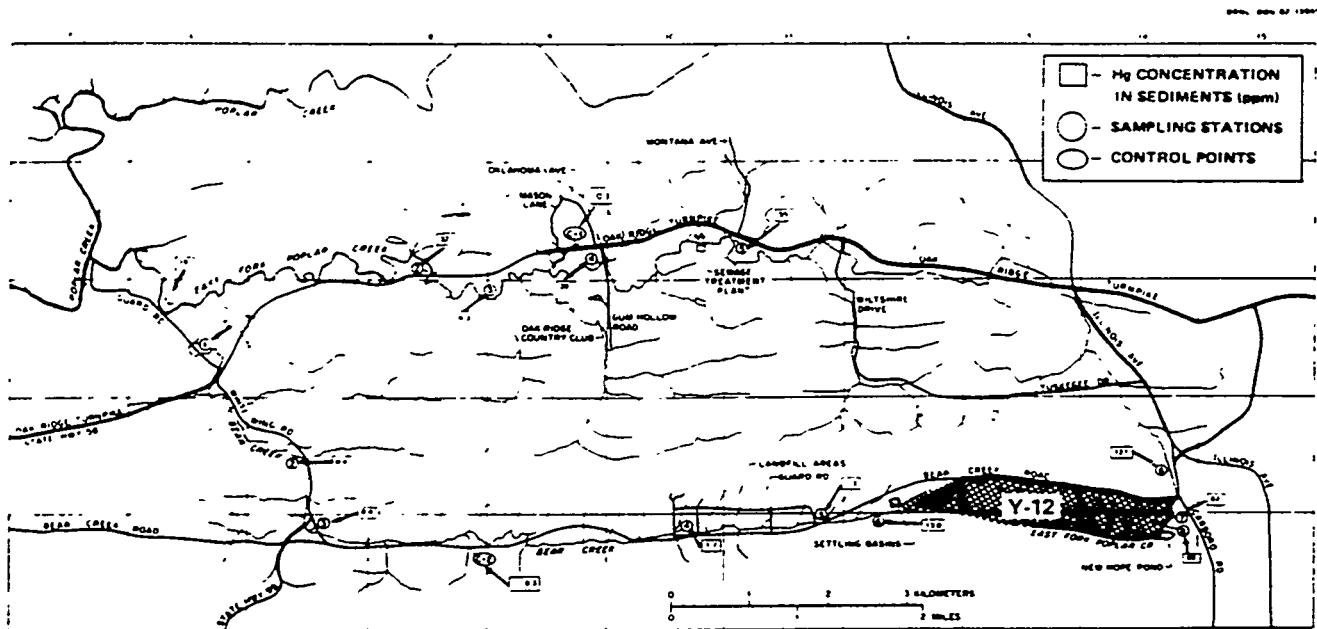
Figure 16. Mercury stored for GSA in the mercury warehouse (Building 9720-26).

be made as to the whereabouts of 0.645 million lb. That is to say that the task force's estimate of the true amount not accounted for is the balance, or about 650,000 lb. This is about 30% of the Y-12 mercury consumption.

The task force noted with interest this statement in a 1975 EPA report on mercury accountability in the chlor-alkali industry: "We have made estimates to cover all known or suspected losses so that the amount of mercury introduced is accounted for. Actually, such accounting is not possible in a typical mercury

cell chlor-alkali plant. Instead, for the industry as a whole, only about 50% of its annual mercury consumption can be accounted for. This does not imply that mercury is indiscriminately lost to the environment; rather it is most difficult to estimate where mercury may accumulate in the system and to what extent."* ■

*D. Garrett, *Material Balance and Technology Assessment of Mercury and its Compounds*. EPA Report 560/3-75-007, prepared for Environmental Protection Agency, Office of Toxic Waste, 1975.



The Y-12 Plant area at the lower right is located in Bear Creek Valley and is bounded by Pine Ridge to the north and Chestnut Ridge to the south. It is drained by two streams, both rising in the Y-12 Plant area. East Fork Poplar Creek flows in an eastward direction away from the plant into New Hope Pond. It then flows north from New Hope Pond, west through the city of Oak Ridge, and west through an unpopulated area to join Poplar Creek near the Oak Ridge Gaseous Diffusion Plant. Bear Creek flows west from Y-12 through uninhabited woods to its confluence with East Fork Poplar Creek. The sampling data shown were reported September 7, 1982, in an ORNL study by Van Winkle et al.

Environment

The losses of mercury to the Y-12 environment as currently (1983) estimated can be summarized as follows:

Lost to	Amount (lb)
Air	51,000
Water	239,000
Land	443,000
	733,000

Losses to air. Most of these losses occurred during Colex process operations (38,000 lb) because of mercury that got into the ambient air during maintenance operations and because of the continuous seepage of mercury from pumps and other equipment. The process required the pumping of hundreds of millions of pounds of mercury under pressure each day. In addition to the Colex losses to the building air and through the ventilation systems, the Elex process operations lost 8300 lb through venting of mercury along with hydrogen gas produced in the process prior to its shutdown in 1957. Smelting of Elex scrap from Building 9204-4 discharged another 5000 lb into the atmosphere. The Elex (electrical exchange) process predated Colex by several years: development started in 1950 and production was started in 1953 in Building 9204-4 and stopped in 1956. The process was less efficient than Colex and was therefore replaced.

Losses to water. Losses to East Fork Poplar Creek are largely traceable to a process waste stream. The operation responsible for generating this waste was an essential step to the process, but this operation was modified in 1958 to reduce mercury losses. Before 1961, about 200,000 lb of mercury was discharged to the creek from the Colex waste stream as a very dilute, neutralized acid waste. The waste stream carrying this mercury into the creek appeared almost clear because of the low concentrations involved. Simulated solutions made up in the laboratory from neutralized mercuric nitrate appear clear and water-white, as would be

expected since the solubility of mercuric oxide is 50 ppm and the concentrations discharged were less than this.

In 1963 and 1964, New Hope Pond (Figure 17) was built to permit mixing so that the degree of variation of the pH of the effluent from the Y-12 Plant could be reduced. The pond was also intended to provide a contingency capacity for control of accidental spills of oils or other substances. An unanticipated benefit was the retention of substantial quantities of mercury-containing sediment. These sediments, as well as the continuing discharge of mercury since then, came from secondary sources of mercury, not from the aforementioned process waste stream that was improved in 1958 and finally discontinued in 1963. Secondary sources of mercury contamination are building drain systems, sewers, and lines connecting to the creek headwaters or upper East Fork Poplar Creek. These lines contain mercury in some of the joints as well as contaminated sludges that continue to serve as a source of small amounts of mercury. Another 29,000 lb is estimated to have been lost to the creek from 1950 to 1983 from all sources other than the Colex process waste stream described earlier. The discharges to the creek are summarized in Figure 18 and Table 5. To arrive at an estimate of the total discharge to East Fork Poplar Creek, several other possible sources of loss had to be considered. Table 5 shows three other source estimates added to the measured values from Figure 18.

This estimate of 239,000 lb was derived largely from measured, historical data reported in Y-12 quarterly reports and can be contrasted to the 470,000-lb estimate in the 1977 report mentioned earlier. The current figure is largely made up of the Colex waste stream measurement, 199,500 lb, plus the 19,500 lb measured since 1961, the sum of which is 219,000 lb. In the 1977 report, the comparable estimate was 235,000 lb. At that time, it was erroneously concluded that the analytical procedures used over the years measured only the soluble mercury, and since it was well known that insoluble mercury was also present in the plant discharge, the 235,000-lb estimate was



Figure 17. New Hope Pond facing north toward the gap through Pine Ridge through which East Fork Poplar Creek flows to Oak Ridge from the pond exit in the background. The Y-12 Plant is located to the left up the valley. The pond influent is distributed by a header all along the foreground shore of the pond.

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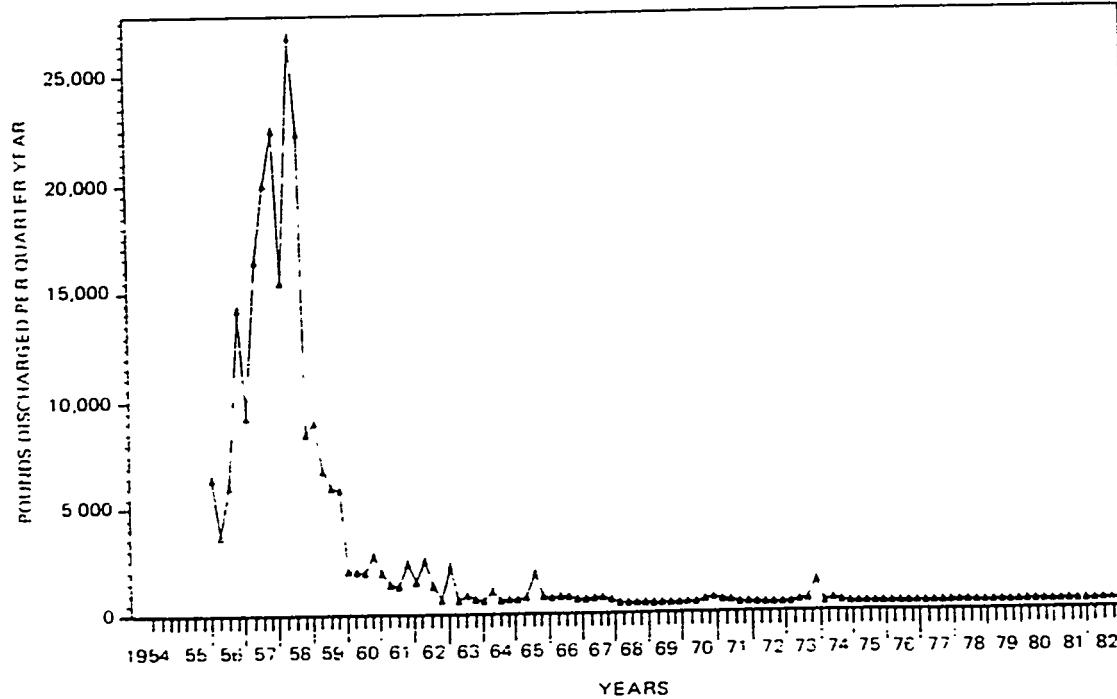


Figure 18. Mercury concentrations measured each quarter in East Fork Poplar Creek multiplied by the measured stream flows. The sum of these quantities is 219,000 lb.

Table 5. Losses (discharges) to East Fork Poplar Creek

Losses	Mercury (lb)
Orex, Elex, Colex, 1950-1954 (estimated)	11,000
Colex waste stream, 1955-1960 (measured)	199,500
Colex metallic and bottom sludges, 1955-1964 (estimated)	7,500
Since 1961 (measured)	19,500
Storm flow adjustment (estimated)	1,500
Total	239,000

doubled. There were possibly two facts that understandably misled the authors of the 1977 report and caused them to come to this conclusion. At the time the report was prepared, water samples from the creek were being filtered and only soluble mercury was being measured. This practice was, however, only begun in January 1974, and prior to that time, the analyses produced numbers which included all the mercury in the sample, soluble plus insoluble. No explanation can now be found as to why the procedure was changed in January to start filtering, but in June 1977 (the month the report was published), the practice was stopped. Another fact that may have been a source of further confusion is that the analytical procedure used from 1957 to 1959, when most of the mercury was discharged, called for filtration of all samples as a first step. However, the filtration was performed through a filter paper impregnated with cadmium sulfide and thus provided a means for removing all mercury, soluble and insoluble, from the sample to ensure measuring the total amount in the filter in subsequent steps. The bottom line is that it is now felt that the doubling of the 235,000 lb was not justified; doubling the estimated quantity discharged during the 3½-year period from January 1974 to June 1977 (311 lb) could be justified, but this does not appreciably affect the total estimate of 239,000 lb. It is the collective judgment of the task force, including those who actually developed the 1977 numbers, that 239,000 lb represents a sound and better estimate than 470,000 lb.

Now a more serious question about these losses arises from the concern over the adequacy of the sampling methods used throughout the years, not over the analyses themselves. There are two aspects of concern. It is now known that mercury deposits on the walls of sample containers and that water samples should be acidified to preserve the initial concentrations. But a greater concern is whether quantities of mercury might have been discharged as either metallic mercury or in sludges containing adsorbed or metallic mercury that were very heavy and stayed on the bottom of the creek, thus not being picked up by the water samples taken from the surface or upper portion of the stream. An estimate of 7500 lb from this source was included in the 239,000-lb figure, but it cannot now be documented.

Lake sediment studies. To provide some verification of both the chronology and quantity of estimated mercury losses to the creek, the task force has undertaken a limited sediment sampling program in Watts Bar and Chickamauga lakes. It has been estimated that 8000 lb is contained in the floodplain and sediments of East Fork Poplar Creek.* The remainder (230,000 lb) presumably is in sediments in Poplar Creek, the Clinch River, or in the remainder of Watts Bar and in the river system below. The initial form of the majority (80%) of the 239,000 lb was soluble or a very finely divided suspension of mercuric oxide, so it could well have been transported considerable distances. Mercury is adsorbed onto the fine particles of silt in the water and would settle very slowly and be resuspended readily. This is contrary to the notion sometimes suggested or implied that since mercury is so dense, it will settle out readily. Experience with mercury contamination from chlor-alkali plants shows that mercury can be transported considerable distances (hundreds of miles) downstream.

Sediment cores were collected at six locations, four on Watts Bar and two on Chickamauga (Figure 19). The cores consist of cylindrical

*Assuming 40 ppm, 12 in. deep, 20 ft wide, 20 miles long, and 100 lb/ft³ density.

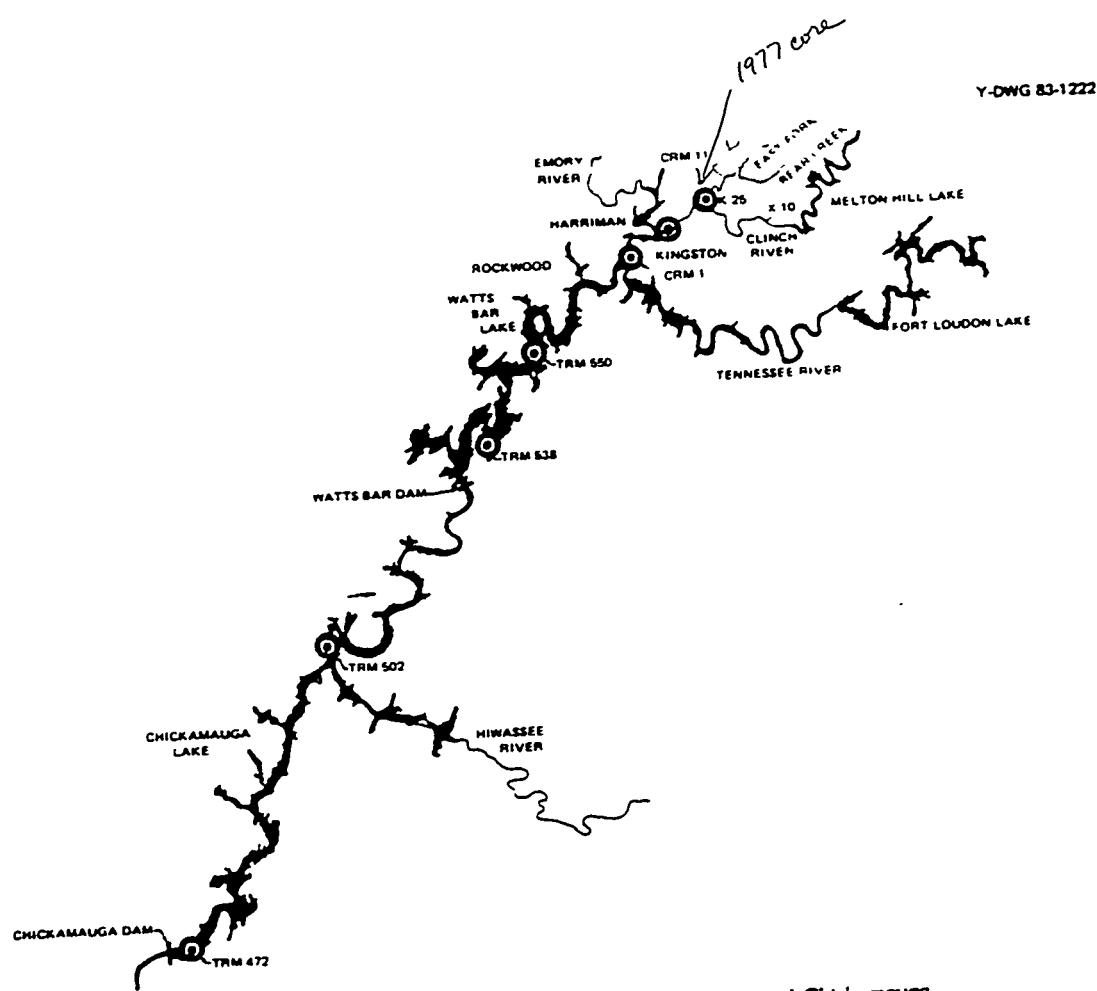


Figure 19. Lake coring study sample sites—Watts Bar and Chickamauga.

columns (or plugs) of mud obtained by pressing a length of open pipe vertically through the entire thickness of lake sediment. The sediment is then extruded from the pipe and sliced into sections (or layers) representing progressively older deposits as the bottom of the core is approached. Each layer is then analyzed for mercury. In addition to the cores obtained recently, one core, collected in 1977 on the Clinch River near the Oak Ridge Gaseous Diffusion Plant (ORGDP), was also retrieved from frozen storage and partially analyzed for mercury. Sediment coring sites were selected by staff of the Earth Sciences Section of the Oak Ridge National Laboratory (ORNL) Environmental Sciences Division, who also conducted the coring operation.

Table 6 and Figure 20 give the results of the task force's sediment study. All but one core showed a sharp peak in mercury concentration in layers 14 to 39 in. below the present sediment

35 - 95 cm

surface in the lakes. These subsurface peak concentrations vary from 3.5 to 180 ppm of mercury, with the highest peaks occurring at locations closest to Y-12. Most of the cores penetrated into sediment layers with only natural background concentrations of mercury (about 0.2 ppm), which indicates that these layers probably were deposited before 1955. It has been possible to date sediment layers by using known radioisotope release dating methods or by simple calculations based on how long the reservoirs have been filled and collecting sediments (40 years for Watts Bar; 43 years for Chickamauga). Both techniques showed that peak concentrations in the Watts Bar sediments correspond to silts laid down from 1955 to 1960, about the time of peak discharges from Colex operations to East Fork Poplar Creek. The correspondence is quite good, suggesting that there was little or no delay in transport to the lake from Y-12.

Table 6. Results of sediment core analyses for mercury—Watts Bar and Chickamauga lakes

	Mud covering ^a (in.)	Highest concentration (ppm)	Core penetrated to background	Recent concentrations (ppm)
Watts Bar Lake				
CRM ^b 11.0		180 ^c	No ^c	
CRM ^d 6.8	32	13.2	Yes	3.8
CRM 1 (Kingston)	39	46.0	No	3.0
Thief Neck (TRM ^e 550)	36	14.0	Yes	1.0
Gillespie Bend (TRM 538)	14	7.0	Yes	0.5
Chickamauga Lake				
Hiwassee River (TRM 502)	30	0.5	No	0.35
Chickamauga Dam (TRM 472)	14	3.5	Yes	0.7

^aDepth of mud covering to level of highest mercury concentration.^bCRM = Clinch River Mile.^cThis core was taken as part of an ORNL study conducted in 1977. At the time of the study, this core was preserved and was analyzed for mercury during September 1983.^dThis core was added to the study after the graphs in Figure 20 were prepared.^eTRM = Tennessee River Mile.

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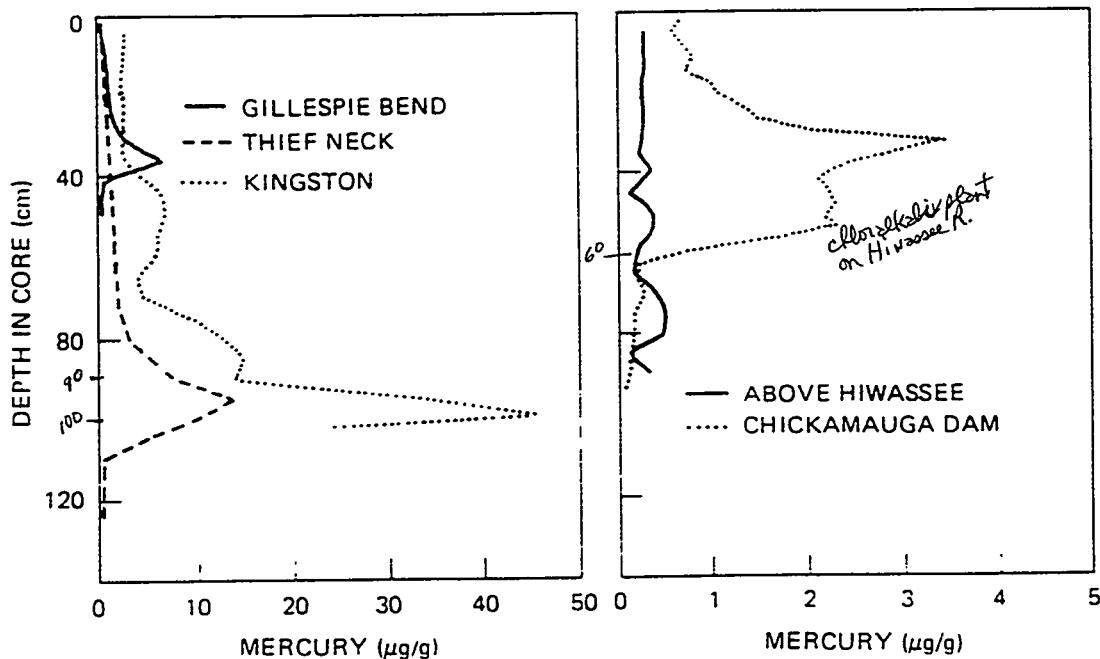


Figure 20. Sediment core analyses for mercury; cores taken from Watts Bar and Chickamauga lakes.

The core taken in Chickamauga Lake just above the confluence with the Hiwassee River did not reveal a subsurface peak in mercury, all values being low (0.2 to 0.5 ppm) and close to natural background values. One interpretation of the data for this core is that Watts Bar trapped essentially all the mercury released at Y-12. The coring site is about 20 miles below Watts Bar Dam and above the influence of mercury discharges (since 1963) from a chlor-alkali plant located on the Hiwassee River. The core collected here contained numerous sandy layers (indicating high water-current speeds and possibility of disturbance) and may not truly represent continuous undisturbed accumulation. In addition, this core may not have penetrated into layers deposited between 1955 and 1960 when mercury losses from Y-12 were highest.

The second core from Chickamauga Lake did show a subsurface peak in mercury and did penetrate into layers with natural background concentrations of mercury (Table 6). Interpretation of the vertical distribution of mercury in this core is complicated by the presence of two upstream sources of mercury—Y-12 and the chlor-alkali plant (operating since 1963) on the Hiwassee River. Preliminary evaluation of the data for this core suggests that the sharp increase in mercury that begins at about 25 in. below the surface can be traced to the chlor-alkali plant. The profile also reveals that the substantial reductions in mercury discharges from the chlor-alkali plant accomplished in the 1970s have been reflected in decreasing concentrations in lake sediments. Further work is expected to resolve the contribution of each facility to the mercury in Chickamauga Lake sediments.

(63cm)

It is of interest, of course, to speculate on how much mercury is in Watts Bar Lake. Calculation requires estimates of average concentrations, average mud thicknesses, and densities. Estimates made on the basis of so few samples relative to the large acreage involved are extremely imprecise, but they suggest that numbers of several hundred thousand pounds are easily within credible range, given the data we now have. And, as stated earlier, the peak layers of

mercury are covered with 1 to 3 feet of sediments deposited in later years.

Bear Creek. The task force also investigated the possibility of mercury contamination of Bear Creek, which rises at the west end of the Y-12 Plant and flows west down Bear Creek Valley. The topography of the plant area is such that drainage from the mercury processing areas involved in lithium separation would not affect Bear Creek. Sampling has shown no mercury in the waters of the creek nor in groundwater monitoring wells downgradient of the S-3 ponds. However, one sample did show contamination (13 ppm) of sediments close to the headwaters in the vicinity of the S-3 ponds. Sampling of groundwater from excavations nearby have shown the presence of mercury [100 parts per billion (ppb)] in water believed to have been contaminated by seepage from the S-3 ponds. The source of mercury which in the past may have been and which now may be contaminating Bear Creek is a processing operation in which small quantities (1 lb per month) of mercury are used as a catalyst (from 1950 to the present). This operation has nothing to do with the lithium cascade operations described in this report. Much effort is now being concentrated on shutting down S-3 pond operations to eliminate this contamination problem. Downstream sediment mercury in Bear Creek is at background levels at about 2 miles above the creek's confluence with East Fork Poplar Creek.

Losses to land. Losses of mercury to the land from Y-12 Plant operations are summarized in the following:

	Amount (lb)
Accidental process losses (eight spills)	425,000
New Hope Pond sediment (current estimate)	8,500
Chestnut Ridge (New Hope Pond sediment)	6,600
Lost to ground at Building 81-10	3,000
Total	443,100

Information on this facet of the task force's study was developed largely from discussions with employees. Each of these spills involved loss of mercury to the ground. Recovering metallic mercury spilled on the ground is very difficult, even when the ground is dug up and recovery is

attempted by roasting; this method was used in some cases. None of the many small spillages and leakages during plant operations and maintenance are included in the 443,100-lb total referred to here because almost all the mercury from these was recovered; it was not lost to the environment. The data on spills (Table 7), 425,000 lb for eight incidents, can be contrasted with the five spills described in the 1977 report. In addition to those five, included now are three other accidents identified in this 1983 study that should properly be defined as process accidents or spills in which mercury was lost to the ground. These three incidents all occurred in Building 9201-2; the total loss was 95,000 lb. Figure 21 shows the location at the plant site of the eight spills.

The New Hope Pond sediment data were estimated from core samples analyzed for mercury. In 1973, about ten years after the pond was constructed, sediment levels had built up so that dredging became necessary. The pond was dredged, and the sediment was removed to the top of Chestnut Ridge just to the south of the pond. The estimated mercury content of the removed sludge is 6600 lb.

Building 81-10 was a shed containing a roasting furnace for recovery of mercury from sludges, wastes, dirt, and other similar materials. During those operations, some mercury was spilled on the concrete pad and on the ground. Core samples taken some years ago were used to develop the estimate given here (3000 lb).

Environmental concern during Colex operations from 1955 to 1963 was focused on quantities of mercury lost to the creek because it was an expensive process material; mercury concentrations were measured and reported quarterly beginning in 1954. Stream flows, and thus total quantities of mercury, were measured and reported beginning in the last quarter of 1955. Mercury releases were primarily an economic rather than an environmental concern because mercury was then thought to be relatively harmless and nontoxic except in the vapor form. The possibility that mercury releases might constitute a much more serious problem was first publicized in the news media in March 1970 by a Canadian scientist who linked high concentrations of mercury in fish in Lake St. Clair to biological conversion of inorganic mercury to highly poisonous methylmercury. The

Table 7. Process accidents involving mercury at the Y-12 Plant, 1951-1966

Date	Location (Building)	Estimated quantity spilled (lb)	Estimated unrecovered loss (lb)	Comment
1951-1955 (3 accidents)	9102-2	100,000-120,000	95,000	Losses in pilot plant
Jan. 1, 1956	9201-5	113,000-170,000	70,000	Coupling broke on pump
July 17, 1956	Ramp north of 9201-5	22,500-90,000	85,000	Valving error
Summer 1956	Between 9204-4 and 9201-5	22,500-90,000	85,000	Valving error
Nov. 15, 1956	9201-5	22,500-45,000	40,000	Column plugged
Mar. 28, 1966	9201-5	105,000	49,853	"Sight glass" tubing broke on tank
Total			424,853	

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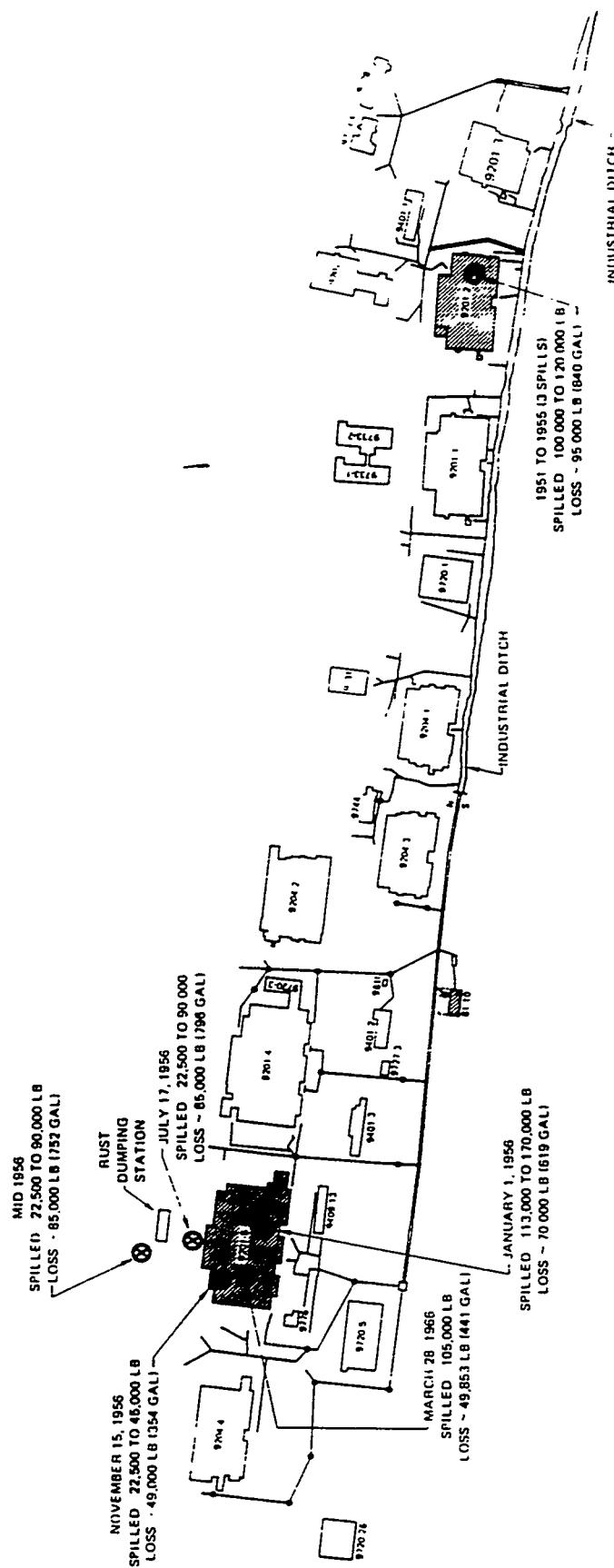


Figure 21. Location of accidental mercury losses to the ground at the Y-12 Plant.

attention thus focused on the methylmercury problem in 1970 was responsible for initiating widespread studies of mercury concentrations in fish as well as in sediments, river water, and other possible sources of contamination throughout the United States. The first Y-12 study of mercury concentrations in East Fork Poplar Creek fish was done in 1970, and it showed a range of 0.32 to 1.30 ppm. A comprehensive ORNL review in that same year surveyed fish from all over the United States and showed, for comparison, mercury concentrations in fish from Pickwick Lake, which ranged up to 2.1 ppm, and from the Holston River, in which the concentrations ranged up to 4.4 ppm.

Several environmental studies have been conducted since 1970. The mercury studies done since the 1970 study by Merwyn Sanders of Y-12 include a study made in 1974 by an AEC-Oak Ridge Operations (ORO) employee, John Reece, who studied sediments in East Fork Poplar Creek and Bear Creek. In 1976 and 1977, J. W. Elwood of ORNL studied water, fish, and sediment from Poplar Creek and the Clinch River. Sampling of mosses and liverworts by ORNL's S. Gough was done in 1981, followed by W. Van Winkle's study in 1982 (ORNL), which examined fish and sediments in East Fork Poplar Creek. Ann Stiff of ORGDP studied fish from Poplar Creek in 1982. These environmental studies have been described in some detail in testimony by Chester R. Richmond and Stanley I. Auerbach at the July 11, 1983, congressional hearings. Their testimony is included as Appendix A of this report.

Fish data. Data on fish generally have been consistent in showing some higher than recommended [Food and Drug Administration (FDA): 1.0 ppm] levels in East Fork Poplar Creek fish but lower levels in those from Poplar Creek and the Clinch River. Statistical analyses of the fish data for 1976 versus 1982 show no basis for believing that mercury concentrations are either decreasing or increasing at the junction of Poplar Creek and the Clinch River or at the junction of

East Fork Poplar Creek and Poplar Creek itself. Although there are a few fish in each year's sampling that exceed 1 ppm, the averages are the controlling factor and they are well below the FDA guideline. See Figures 22 and 23 for graphic depictions of mercury concentrations in several species of fish from these local waters.

Sediments. In 1970 Merwyn Sanders (of the Y-12 Plant) found a maximum of 63 ppm mercury in 10 sediment samples. In 1974 John Reece (AEC-ORO) found a maximum of 72 ppm and an average of 19 ppm in 16 samples. Van Winkle (ORNL) found a maximum of 127 ppm in his 1982 study. One sample from the property on Illinois Avenue at the Oak Ridge Turnpike ran 480 ppm. Looking at these maximums may suggest that sediment contamination in East Fork Poplar Creek has been growing worse in recent years. But examination of all the numbers suggests no sound basis for either confirming or denying this idea. Two factors complicate the analysis: (1) concentrations vary with distance from Y-12 so that location of sampling is important and (2) concentrations vary with particle size of the sediment, the amount of sand or of silt. Uncertainties exist in the early data on both counts. There is one set of fairly homogeneous samples taken at K-25 for the annual environmental reports over the past six years. These involve sediment samples taken each year at the same 14 locations in Poplar Creek below the junction of East Fork. Statistical analysis of these data showed no evidence of a real change in sediment contamination over this past six-year period.

Putting all of these environmental mercury data in proper perspective is difficult from a technical standpoint. Survey and review articles on mercury in the environment over the years present instances of fish, water, and sediment samples having even higher concentrations in other locations in the United States. The situation with East Fork Poplar Creek is somewhat unusual in that most other mercury discharges have been to much larger streams or to rivers. However,

1977-1983

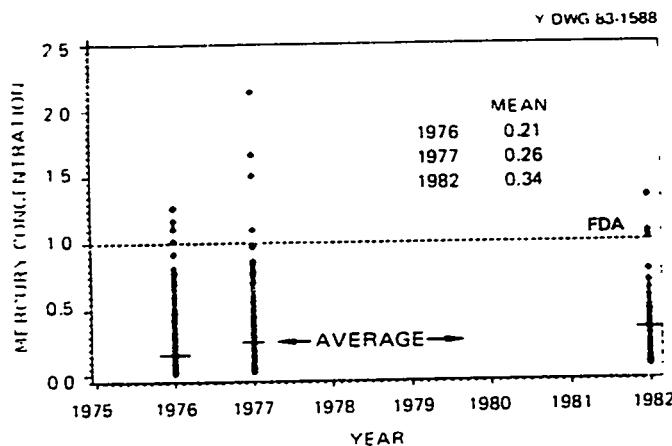


Figure 22. Fish from Poplar Creek and the Clinch River. Species sampled include bass, bluegill, catfish, and crappie [concentration measured in micrograms per gram (ppm)]. The dotted line represents the Food and Drug Administration (FDA) guideline for edible fish flesh.

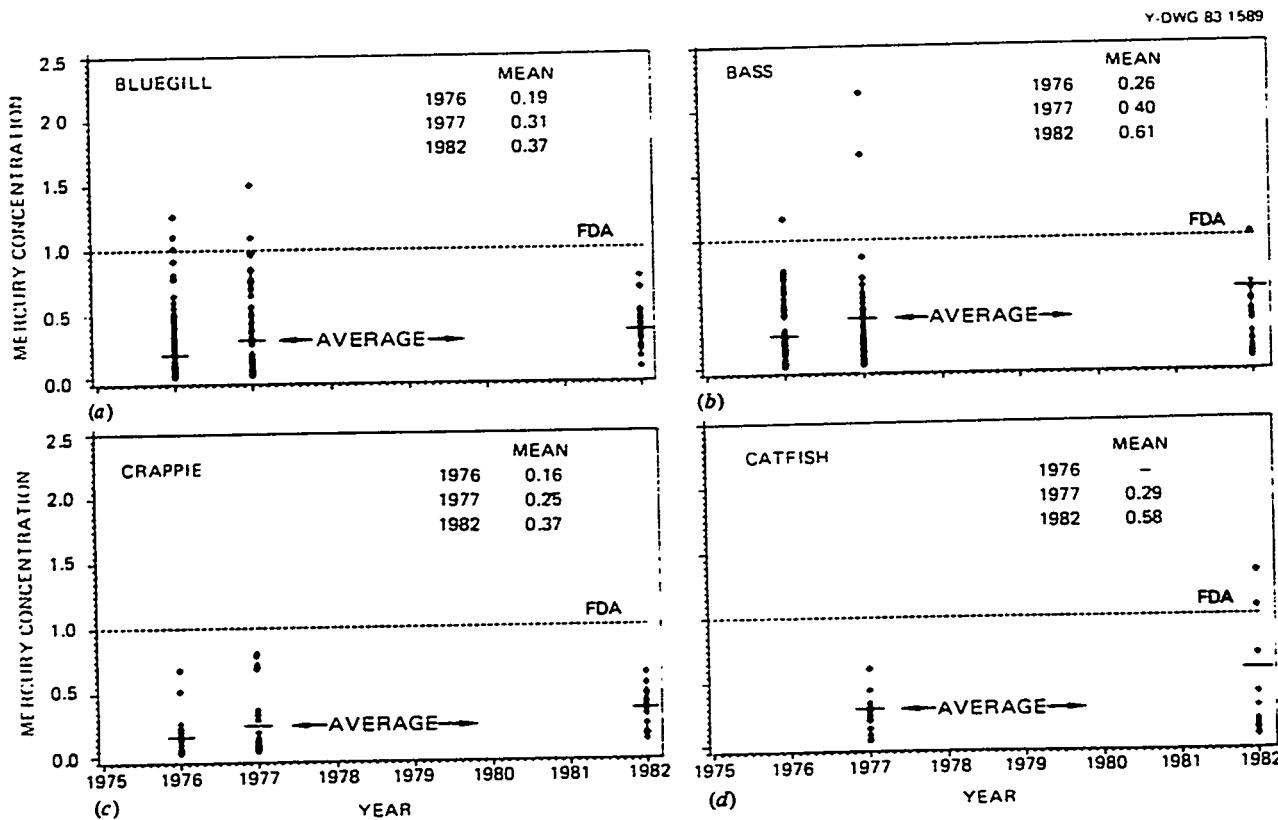
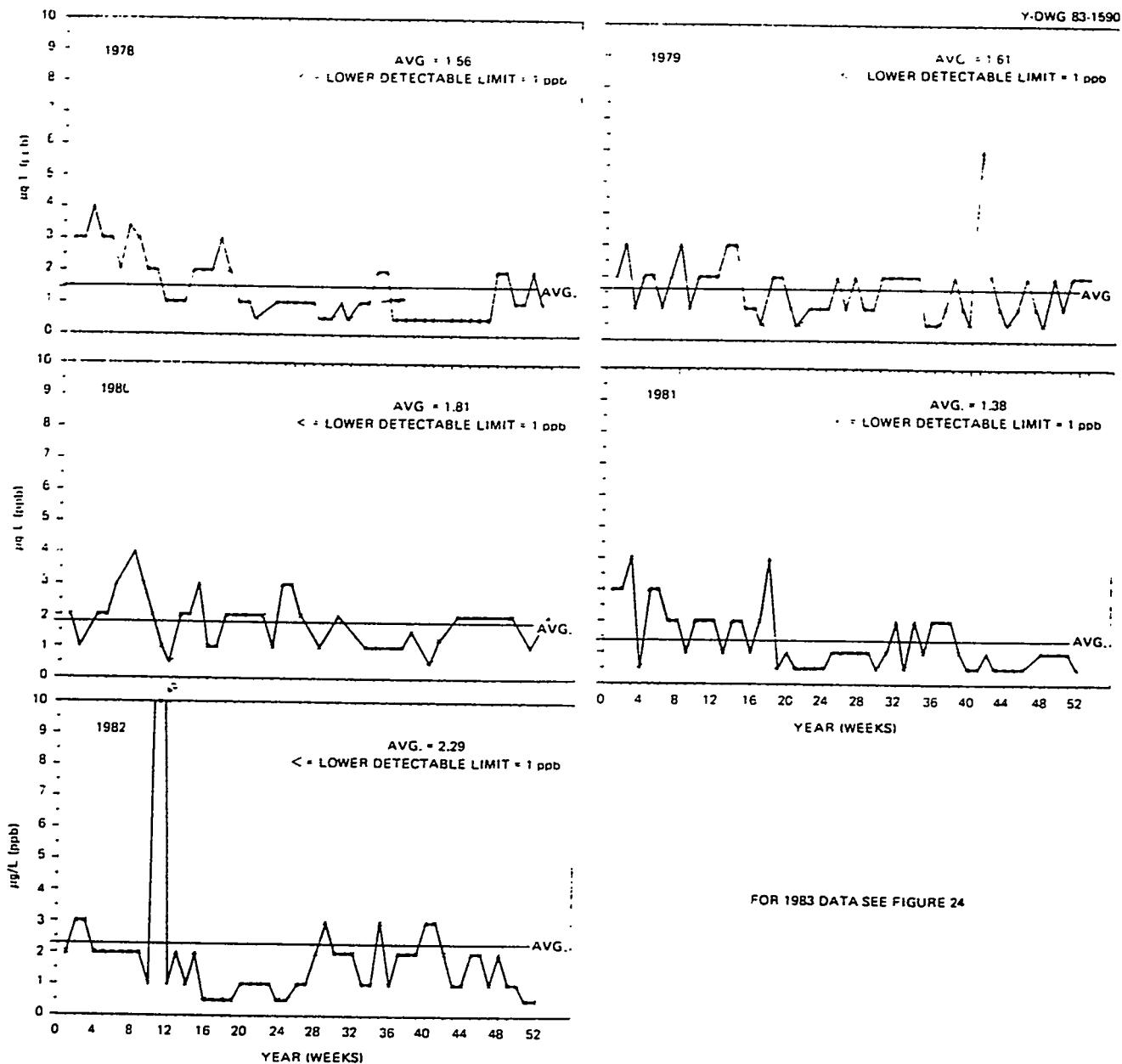


Figure 23. Fish from Poplar Creek and the Clinch River. Species sampled: (a) bluegill, (b) all bass, (c) crappie, and (d) all catfish [concentration measured in micrograms per gram (ppm)]. The data are from studies by J. Elwood, ORNL, 1976 and 1977, and by A. Stiff, K-25, 1982.

the relevant question is, what health risk problems, if any, do past or current discharges pose today? The risks from East Fork Poplar Creek water and sediment contamination are so low that they are very hard to quantify. In this study, the only target population thought to be in any way at risk is persons who would continuously eat large amounts of East Fork

Poplar Creek fish, which in some cases concentrate mercury to levels higher than the 1.0 ppm recommended by the FDA. However, the small fish population makes it unlikely, though not impossible, for a person to take in dangerous quantities of methylmercury. This topic is addressed more fully in the testimony by C. R. Richmond and S. I. Auerbach (see Appendix A). ■



FOR 1983 DATA SEE FIGURE 24

Mercury concentration in water at the New Hope Pond outlet, 1978–1983.

1980

Current Assessment

Current discharges to East Fork Poplar Creek are monitored by taking samples of the outflow of New Hope Pond (Figure 24). "Grab" samples are taken every Monday morning (and almost daily since mid-1983), and a "composite" sample is taken on a flow-proportional basis throughout the week. During 1983 the average daily concentration of mercury in the outflow from New Hope Pond has been 2.6 ppb. The actual grab sample data are shown in Figure 24. The large increase in mercury discharges occurring in June and July resulted from a cleanup program undertaken in the Colex production area that unavoidably stirred up old sediments and increased the amount of mercury discharged to the creek. In addition, a water line break in Building 9201-4 in July resulted in an added discharge of residual mercury.

Discharge data (grab samples) for recent years are shown in the figure opposite, with average concentrations shown for each year. Large increases (spikes) other than those observed during the summer of 1983 are associated with large storm runoffs at the time the samples were taken (Monday mornings). These data are also represented (in less detail) in Figure 18.

Since grab sampling started several years ago, the average daily concentration has been 2.0 ppb.* Taking flows into account, the average quantity is about 60 g (2.1 oz) per day, or about 50 lb per year for this period.

This average concentration, coincidentally, is identical to the standard established by EPA for drinking water (2.0 ppb), but it is in excess of the guideline for water quality established by the state of Tennessee for fish and wildlife streams (0.05 ppb). That guideline is considerably lower than the EPA level of 2.0 ppb and below the

*In the years since the 1970 publication of biological methylation of mercury, a number of reviews have been published that report on the distribution of mercury in the environment, both naturally occurring and man-caused, in rivers, sediments, soils, rain water, vegetables, and many others. These reviews verify that our local concentrations are significantly above usual natural background though less than some natural sources. A worldwide review by Kaiser and Tolg in 1980, for example, cites among other values ranges of river water concentrations near naturally occurring mercury deposits of 0.5 to 100 ppb, in hot springs and mineral waters of 0.01 to 20 ppb, and in the Rhine (Wiesbaden) of 0.03 to 8.4 ppb. [G. Kaiser and Tolg, "Mercury," in *The Handbook of Environmental Chemistry*, Vol. 3, Part A, Springer-Verlag, New York, 1980.]

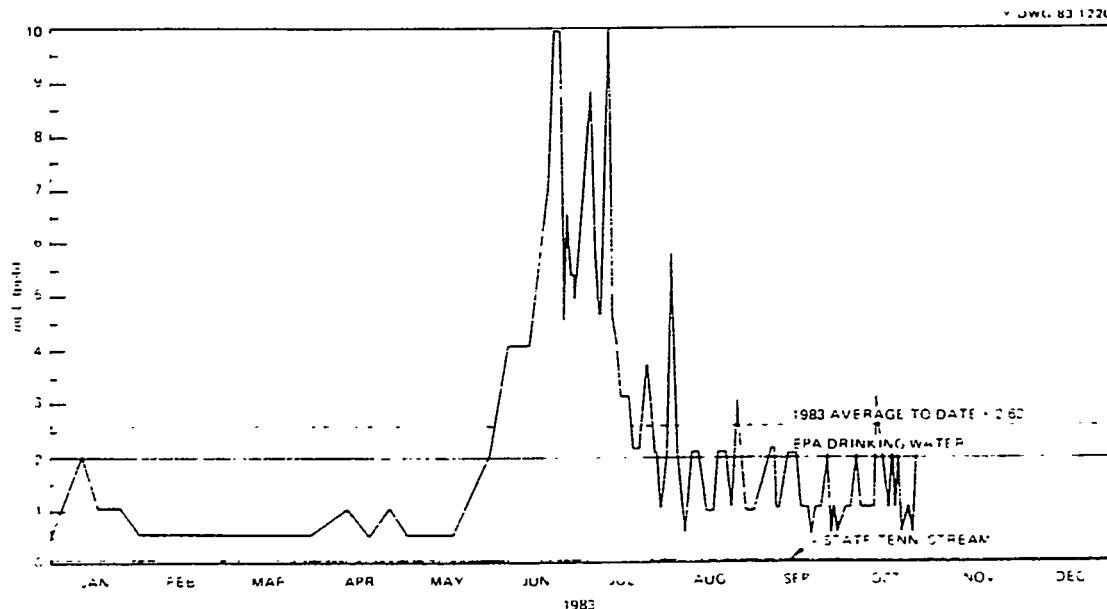


Figure 24. Mercury in New Hope Pond effluent—East Fork Poplar Creek.

state guideline for domestic water supplies (0.2 ppb) to allow for the natural process of concentration of mercury by fish ($\times 10,000$) so that it will result in fish flesh concentrations below the allowable FDA guideline of 1.0 ppm. A number of actions are under way to try to further reduce plant discharges.

Material balance studies have been done during the last year to find out where this mercury originates. Pipes feeding water into the creek headwaters that flow into New Hope Pond were sampled and the flow was measured. Effluent pipes from Buildings 9204-4 and 9201-5 together contributed about 47%, pipes from Building 9201-4 contributed about 44%, and pipes from Building 9201-2 contributed about 8% of the mercury entering New Hope Pond during a careful two-day study in December 1982. Figure 25 gives plant locations and results of sampling from these effluent lines at that time. The pond effluent on those days was 42 g, and about 100 g (71%) was retained in the New Hope Pond basin.

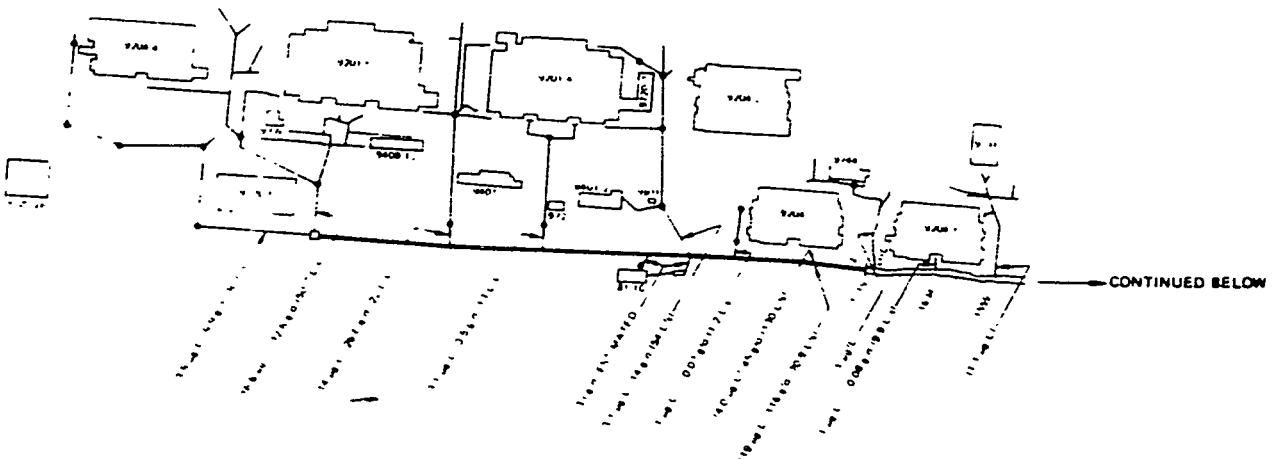
In the last few months, there has been an active program to identify and clean up the secondary mercury sources in the Building 81-10 mercury recovery area; the sumps of Buildings 9201-4, 9201-5, and 9201-2; drain lines; and storm sewers. In addition, there have been two water-line breaks this past summer that have spilled a lot of water into the basement of the Colex

process building (Building 9201-4); the first break resulted in an increase in mercury discharges to the creek. The second of these breaks has been contained in the building basement and mercury is being separated from the water to reduce its concentration to a value acceptable to the state prior to discharge to the creek.

In addition, Y-12 is undertaking subsurface studies to determine whether mercury accumulations can be detected below sites of major spills or operating buildings. A further objective is to find out whether there is any significant contamination of groundwater from these past losses. Three wells at each of ten locations have already been drilled and are being cased to permit groundwater samples to be taken. Analyses of the cores taken from these holes show very little mercury in the soil around the old production buildings. But these sites were chosen to monitor groundwater downstream of spill locations and were not drilled at the exact sites of the known spills. Full results will not be available from this program for several more months. Also under study is the Chestnut Ridge site, which was used for storage of sediment dredged from New Hope Pond in 1972, to see whether it is contaminating groundwater. In addition, many other analytical and engineering studies are under way in support of the DOE-EPA-State Memorandum of Understanding on Y-12. ■

Y-DWG 83-767RA3

**Hg DRAIN LINE SAMPLING PROGRAM
DECEMBER 9 & 10, 1982**



Y-12 PLANT AREA WEST

Y-12 PLANT AREA EAST

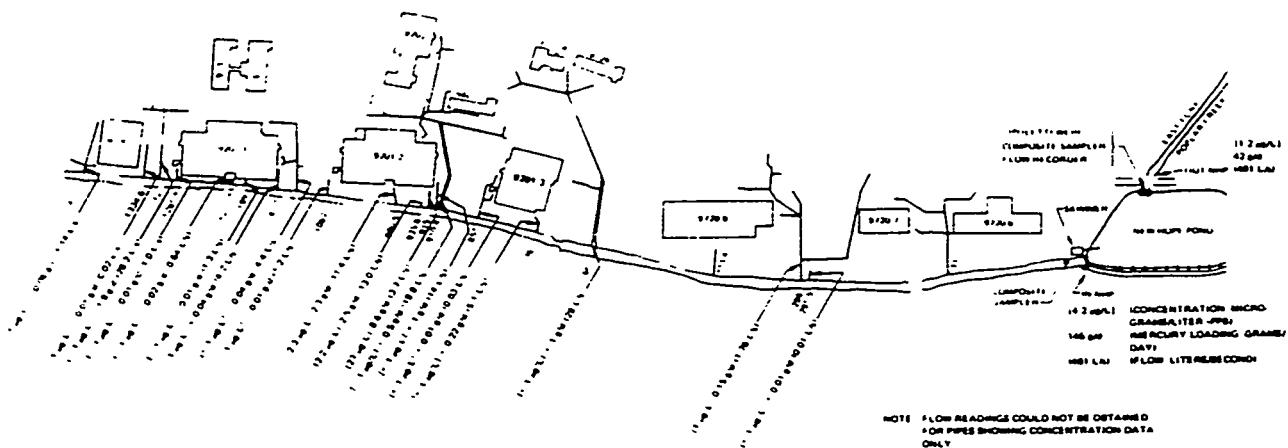


Figure 25. Sampling locations and results from the December 9–10, 1982, check of Y-12 Plant drain lines for mercury content.

Conclusions

Worker health was clearly a major concern of both the AEC and Y-12 Plant managers during the period of Colex operations from 1955 to 1963. During the start-up period in 1955, much higher concentrations of mercury vapor in the workplace air were experienced than were desired and a major effort was required to reduce these concentrations to acceptable levels. This effort was successful early in 1956, and operational levels for the next seven years were acceptable. No effects of chronic mercurialism were found in a 1974 follow-up study of those workers who had shown the highest mercury urinalysis values. A 1983 epidemiological study by ORAU found no significant differences among Y-12 mercury workers, Y-12 nonmercury workers, and a U.S. general population group in the death rates from all causes or from a number of different kinds of cancer. There is no evidence here at Y-12 or in other studies of mercury exposure that would suggest that mercury causes cancer. Another medical checkup of the mercury workers at higher risk is currently under way.

Material accountability has been restudied in an effort to develop the best estimate of the mercury material balance. There are a number of increases and decreases from the 1977 Y-12 report, and these differences have been reconciled. The combined "lost" and "unaccounted-for" mercury total is 2.0 million lb rather than 2.4 million lb. Of the 2.0 million lb, 0.7 million lb was lost to air, water, and land, leaving 1.3 million lb that is unaccounted for using the 1977 accounting system. Although it cannot be documented, it is the task force's opinion that a sizable part (0.5 million lb) of this

unaccounted-for mercury was never received by Y-12, and good guesses can be made as to the disposition of another 0.15 million lb, which leaves a net unaccounted-for estimate of 0.65 million lb.

Environmental concerns in the Colex operations were focused on the quantity of mercury discharged, and these releases were monitored beginning in 1954. The quantities released and their origins have been detailed in the present studies. The sources and nature of most of the discharge to East Fork Poplar Creek are known. The majority of the mercury was discharged in a very dilute process waste stream (not as metallic mercury) between 1956 and 1959. In 1958 changes were made in the process to reduce these losses significantly. The quantities released in recent years are of course far smaller, in the past six years an average of 2 ppb or about 15 lb per quarter compared with some 2000 lb per quarter in 1960. Studies using drilling techniques to try to determine whether groundwater is contaminated and possibly to learn something about the current location of mercury lost to the ground in Colex accidental spills are in progress.

Available data support the judgment that there is no immediate or foreseeable risk to the health of the public as a result of past or current mercury discharges other than an unlikely possibility of harm that would result if a person were to ingest on a continuing basis a large number of East Fork Poplar Creek fish containing higher than 1 ppm mercury. At the Y-12 Plant the programs under way and being planned should further reduce the present mercury discharges into the creek and so reduce the likelihood of problems arising from this source. ■

Appendix A

**Congressional Testimony by C. R. Richmond and
S. I. Auerbach, Union Carbide Corporation,
on the Impact of Mercury Releases
at the Oak Ridge Complex**